# PRO SOLOIST MODEL 2701
# PRO/DGX MODEL 2720

# SERVICE MANUAL

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ARP INSTRUMENTS, INC.
45 Hartwell Avenue
Lexington, MA 02173
(617) 861-6000

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## 1. Introduction

Included in this service manual are troubleshooting references which if used properly can greatly reduce the repair time of the Pro Soloist.

Section 2 covers the signal flow through the Pro Soloist. Section 3 describes design techniques unique to the product. Section 4 describes 'where to start' when a problem occurs. The circuit descriptions in section 5 should be consulted once a faulty circuit has been identified by the use of the R.O.M. truth tables and Voice Flow charts in sections 7 and 8.

VOICES AND EFFECTS

| | |
|---|---|
| Bassoon | Buzz Bassoon |
| English Horn | Sax |
| Oboe | Space Reed |
| Clarinet | Telstar |
| Flute | Song Whistle |
| Tuba | Noze |
| Trombone | Pulsar |
| French Horn | Comic Wow |
| Trumpet | Mute Trumpet |
| Cello | Steel Guitar |
| Violin | Harpsichord |
| Bass | Space Bass |
| Piano | Steel Drum |
| Banjo | Country Guitar |
| Fuzz Guitar I | Fuzz Guitar II |

CONTROLS:

*Portamento*—Enables the pitch to slide from note to note.

*Portamento Speed*—Regulates the time required to slide from note to note.

*Touch Sensitivity*—Controls the over-all amount of keyboard touch sensor effects.

*Brilliance*—Permits the addition or subtraction of brilliance.

*Volume*—Regulates the over-all volume of the instrument.

*Repeat*—Creates the rapid pick strokes of string instruments.

*Vibrato/Repeat Speed*—Controls the vibrato speed and repeat rate.

*Octave Transpose Switch*—Transposes the instrument up and down one octave.

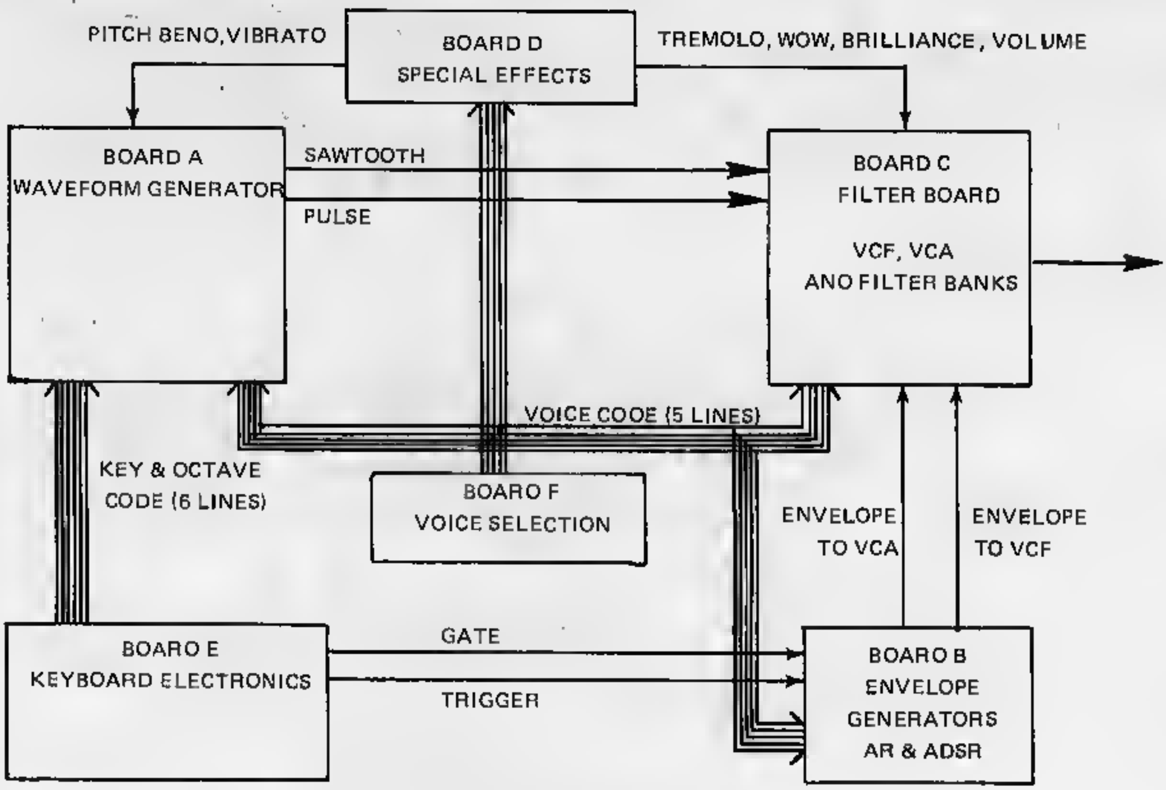
## 2. Theory of Operation

The Pro Soloist is a hybrid of digital and analog circuits. The internal flow of the audio signals is, in most respects, quite similar to any of our other synthesizers. That is, a raw signal (pulse or sawtooth wave) is processed through a voltage controlled filter and a voltage controlled amplifier to the output of the instrument. Two envelope generators (ADSR and AR) are available to control the VCF and VCA to determine the attack and decay characteristics of the instrument. In addition to the voltage controlled filter, there are fixed band pass filters which shape the raw waveforms for particular voices.

In variable synthesizers, such as the ARP Odyssey or the ARP 2600, the signal paths, oscillator waveforms and filter characteristics are adjusted manually. In the Pro Soloist, each of these settings are programmed by a digital memory. (Read Only Memory, or R.O.M.).

Referring to the block diagram, Board A is the Waveform Generator board. A sawtooth wave and a pulse wave are supplied(at the correct pitch) to Board C, the Filter board. Board C contains the voltage controlled filter (VCF), the voltage controlled amplifier (VCA), and 14 fixed filters. The signal paths through board C are determined by the R.O.M. outputs which select one of several paths through the different filters.

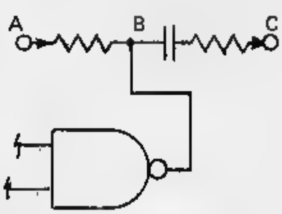
Board B provides the ADSR or AR output to the VCF and/or the VCA (again determined by the R.O.M.s). Board E (keyboard electronics) sends a 6 bit (6 line) code to board A to control the pitch of the oscillator. Board E also supplies the envelope generators on board B with a gate and trigger. Board F, the Voice Selection board, generates a 5 bit code which addresses all of the R.O.M.s (eight total) which in turn program the signal paths and filter settings. The Special Effects board (D) generates the touch sensor effects: vibrato, growl, wow, volume, brilliance and pitch bend.




**PRO SOLOIST BLOCK DIAGRAM**

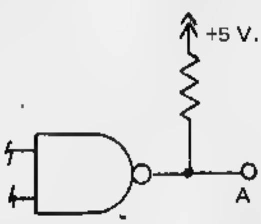
## 3. General Information

The digital circuits in the Pro Soloist employ 'open collector' TTL devices. This means that a logic 1 is an open circuit, and a logic 0 is ground. The voltage level on the output of this type of gate does not necessarily relate to the logic level. Illustrated below are two uses for the open collector type gates which will be found in the Pro Soloist.




B = LOGIC 1: Signal passes from A to C (B is open)

B = LOGIC 0: Signal is stopped (B grounds out the signal)




A = LOGIC 1: +5 VOLTS

A = LOGIC 0: 0 VOLTS

It is necessary in some circuits to add (externally) a "pull up" resistor (22K typical) from the +5 volt power supply to the output of an open collector type gata so that the logic level can be identified with a DVM or oscilloscope. Always verify the logic state of these chips in this manner before assuming the device is defective.

## 4. Trouble Shooting Procedure

INSTRUMENT DEAD: When the Pro Soloist is totally dead, the following should be checked:

1. Power supply: Check the +15 volt, -15 volt and +5 volt outputs. If the power supply (board G) is malfunctioning, remove the power connector from board C and connect the supply to a dummy load while troubla shooting (see the power supply section for dummy load values).
2. VCA: All signals in the Pro Soloist are routed through the VCA; therefore, the output of the VCA should be checked while a key is depressed. If there is no signal, check the output of the VCF. If there is still no signal, check the sawtooth and pulse outputs of board A.

VOICES MISSING, INCORRECT OR DEAD: When some of the voices are correct and some incorrect, the defective circuit common to the incorrect voices must be identified. Proceed as follows:

1. Check the voice code output of board F: This code addresses ALL of the Read Only Memory chips in the Pro Soloist. See the board F circuit description section for the voice code truth table.

*CONTINUED ON NEXT PAGE*

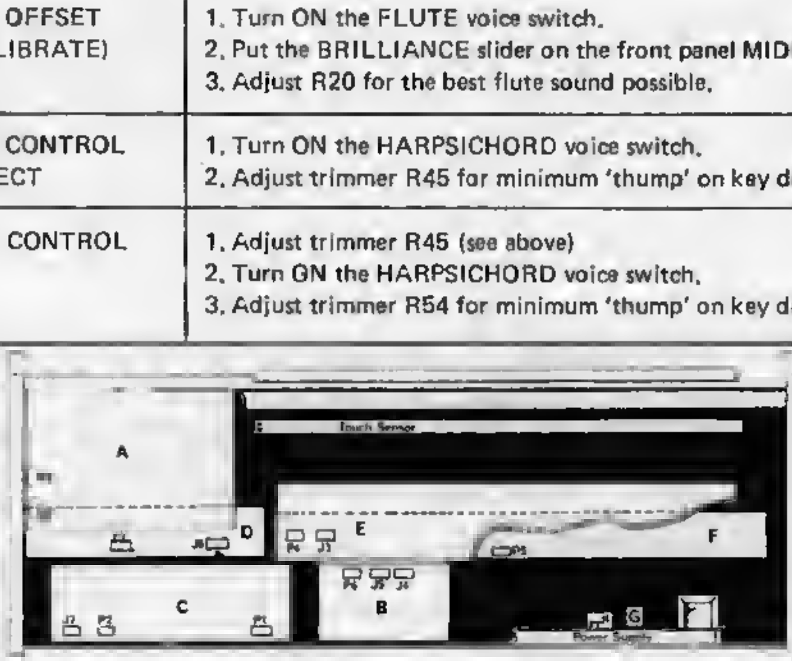
2. Make a list of *all* the defective voices.

3. Consult the Voice Flow charts in this manual to determine the circuit which is common only to the voices listed above.

4. Consult the schematics, Voice Flow chart test points and the R.O.M. truth tables to determine the code outputs of the R.O.M. which is in the suspected circuit. *Caution: The R.O.M. is often falsely accused of being defective; the failure rate of the R.O.M.s is actually very low. Example: [illegible]oe, [illegible] and Electric Piano are dead, Violin and Cello are not correct. Conclusion: defective resonator bank 3, board C; change Z2B.*

## 5. Tuning and Calibrations

| REF. | TRIMMER | TRIM PROCEDURE BOARD A |
|---|---|---|
| R37 | VCF TRACK | 1. Pin low C on the keyboard.<br>2. Moniter TP-1 (J2-4) with a digital voltmeter.<br>3. Adjust trimmer R37 for exactly zero volts. |
| R29 | SET 'B' | 1. Pin low C on the keyboard.<br>2. Turn ON the VIOLIN voice switch.<br>3. Put the vibrato switch DOWN.<br>4. Adjust trimmer R24 (TUNE) so that the Pro Soloist is tuned to low C on an organ or strobe tuner.<br>5. Pin the [illegible] key on the keyboard.<br>6. Adjust trimmer R29 so that the output of the Pro Solist is tuned to 'B' on the organ or strobe tuner. |
| R49 | TOUCH SENSITIVITY | 1. Turn ON the TRUMPET and PITCH BEND switches.<br>2. Put the TOUCH SENSITIVITY slider on the front panel in the MIDPOSITION.<br>3. Adjust trimmer R49 for the amount of pitch bend desired by the customer on a firm key depression (usually maximum). |
| R24 | TUNE | 1. This control is used to tune the Pro Soloist to the same frequency as other instruments it is being used with. It is adjustable from the front for the customer. |
| | | BOARD C TRIM PROCEDURE |
| R20 | VCF OFFSET (CALIBRATE) | 1. Turn ON the FLUTE voice switch.<br>2. Put the BRILLIANCE slider on the front panel MIDPOSITION.<br>3. Adjust R20 for the best flute sound possible. |
| R45 | VCF CONTROL REJECT | 1. Turn ON the HARPSICHORD voice switch.<br>2. Adjust trimmer R45 for minimum 'thump' on key depression (turn amplifier up) |
| R54 | VCA CONTROL | 1. Adjust trimmer R45 (see above)<br>2. Turn ON the HARPSICHORD voice switch.<br>3. Adjust trimmer R54 for minimum 'thump' on key depression (turn amplifier up) |




2701 BOARD LOCATIONS

## 6.1 Board A circuit Description

The 4 bit key code from board E is converted to an analog control voltage in the D to A converter. Although the 2 bit octave code is also fed to the D to A converter, it serves as a correction voltage; the octave control over the voltage controlled oscillator is in the Frequency to Voltage converter circuit. The output of the D to A converter is +5 volts when any C key is depressed. When any C# key is depressed, the D to A output increases to about +5.3 volts. The highest voltage produced by the D to A converter is +9 volts when any B key is depressed. Trimmer R29 (set 'B' trimmer) sets the interval between each key and is equivalent to the volts per octave trimmers in the standard ARP synthesizers except that it only affects the interval between C and B on the keyboard rather than from low C to high C.

The voltage from the D to A converter is fed through a differential amplifier to the voltage controlled oscillator circuitry. Here the control voltage (now -1 V/OCT) is supplied to a linear voltage to exponential current converter (Q3 and Q4). Q4 determines the charging time on capacitor C7. C7 and Q5 are a unijunction oscillator operating at about seven or eight octaves higher than the pitch that is heard on the output of the Pro Soloist. Q6 makes the sawtooth from Q5 compatible with TTL circuitry and supplies it to the frequency to voltage converter. Z3 and half of Z1 are divide by two chips which are enabled by the two bit octave code from board E. Depending in which octave a key is being depressed, none, one, two or three of these dividers are enabled to supply Z22 (one shot) with a pulse wave which is either at the same frequency as the oscillator, or one, two or three octaves lower. Since the pulse width on the output of the one shot is constant, the repetition rate (frequency) of the pulses is integrated to provide an offset voltage to the differential amplifier thus providing the octave control over the oscillator (4 octaves). The output of the differential amplifier will have a large AC component which is filtered by C4 and C5 to yield a DC control voltage (-1V/OCT) on J2-4.

The output of the voltage controlled oscillator is also supplied to the Programmable Octave Dividers. Depending on the voice selected, R.O.M. Z15 will instruct half of Z1 and Z8 to either send the signal through the circuit, or divide it either once, twice or three times (down 1, 2 or 3 octaves). The manual octave dividers divide the signal even lower, depending on the position of the Transpose switch. The signal then enters the Six Stage Frequency divider circuit whose output is processed in the Sawtooth Sum circuit. Each of the divisions is weighted and summed to produce a +10 volt sawtooth made of 64 small steps.

The Pulse Generator circuit monitors the outputs of the six stage dividers to develop the following pulse widths: 1/14, 1/9, 1/64 and 2/11. Additionally, the Dynamic Pulse Converter circuit develops a variable (dynamic) width pulse wave. All of the pulse waves are supplied to the Pulse Selection circuit where one is selected by R.O.M. Z15 and routed to the pulse output.

## 6.2 Board B Circuit Description

Board B is the Envelope Generator Board. Z1, Z2 and Z3 (R.O.M.s) program the attack time, decay time, sustain level, and release time of the ADSR envelope generator and the attack and release times of the AR envelope generator.

ADSR: The output of the attack R-S flip flop (Z4 pin 3) changes from logic 1 to logic 0 when a gate and trigger are supplied from the keyboard electronics (board E) on J4-6 and J4-7. Z5 pin 3 provides a logic 1 which allows R64 to charge the integrating capacitor, C3. Q4 and Q5 follow the voltage and supply it to the switching circuitry to be routed to either the VCF and/or the VCA.

Q6 is a "peak detector" comparator. When the ADSR output reaches the maximum voltage (about +5 volts) Q6 resets the R-S flip flop output (Z4 pin 3) to logic 1. The voltage on C3 then discharges through CR16, CR17 or CR18 to the voltage level on the junction of R30, R31 and R32 (sustain level). When the gate on J4-6 is no longer present (all keys up) the remaining voltage on C3 discharges through CR20 and pins 3, 4 or 5 of Z1 to zero.

AR: The gate voltage is supplied to the AR circuit from Z5 pin 8 to charge capacitor C2 through CR2, CR3 or CR4. When all keys are released, the voltage on C4 discharges through CR5 or CR6 back to pin 8 of Z5.

R.O.M. Z3 selects which envelope (ADSR and/or AR) is to be routed to P6-16, the VCA control input. Z3 also selects which envelope is to be supplied to Z6. R1, R2, R3 and R4 attenuate the envelope before it is processed through Z6. Z6 sums and inverts the ADSR or AR envelope, the growl signal from board D and the touch brilliance voltage from board D. The envelope must be inverted because the VCF accepts negative going control voltages. The output of Z6 is connected to the control input of the filter via the brilliance slider on board A.

Q7, Q8 and Z4 pins 9, 10 and 11 are the squelch circuit which provides a momentary pulse to the VCA

control input to turn it off to prevent transients from being heard when a voice switch is turned on.

### 6.3 Board C Circuit Description

Board C contains e voltage controlled filter (VCF), a voltage controlled amplifier (VCA) , four high pass filtars (HPF) and ten band pass filters (arranged in ona of three banks). R.O.M.s Z6, Z7 and ZB determine the signal peths through each of these filters and determlnas the sattings for the VCF.

The sawtooth waveform supplied from board A is processed through tha Sawtooth/Pulse Mixer and is routed through one or more of the High Pass Filters. The output of the HPF is routed through the VCF and the VCA to the output of tha Pro Soloist.

The pulse waveform from the pulse amplifier can take either of two paths: through the Sawtooth/Pulse mixer, or through the resonator banks. Resonator banks 1, 2 and 3 ara supplied with the pulse wava-form only. R.O.M. ZB determines which (if eny) of tha resonators in each bank are enebled, The output of Resonator Bank 1 and 2 may routed only to the input of the VCA. The output of Resonator Bank 3 may be routed to the input of either the VCF or the VCA (egain, determined by R.O.M. ZB).

The VCF Tracking circuit detarmlnes whether the VCF will track at ona volt per octave, 2 volts per octave, 5 volts per octave, or not at ell. The Res-onenca circuit determines the emount of faedback from tha VCF output to the VCF input for 'wow' affects.

### 6.4 Board D Circuit Description

Board D provides the touch sensor effects: Vibrato, Pitch Bend, Wow, Repeat, Growl, and Brilliance.

Z3 is a low frequency oscillator producing a triangle weve for vibrato and tremolo, and a square wave for repeat triggers.

Z4 and Z5 ere a voltage controlled amplifier exclu-sively for tha vibrato signal. Q3, O4 and Q5 delay the Vibrato VCA from turning on for certain voices (such as violin) producing a delayed vibrato. All 'upper' voices heve delayed vibrato (if used at all); lower voices have undelayed vibrato. Z4D and Z4E switch tha output of the Vibrato VCA to either P7-11 for vibrato or P7-16 for tremolo. Vibrato and tremolo are never on et the same time. Tremolo affects the VCF on board C; vibrato effects the pitch of the oscillator on board A.

Z2 B and Z2C are an astable flip flop oscilleting et 32 Hz. to produce the growl signal. This signel is gated into a band pass circuit (Z2D and Z2E) through CR8. The growl output is epplied to the VCF control input through Z6 on board B.

### 6.5 Board E Circuit Description

The keyboard electronics generate three signals which are routed to other perts of the instrument:

1. Pitch information (4 bit key code and 2 bit octave code).
2. Gate (+5 volts while a kay is down),
3. Trigger (short pulsa on each new key depression).

The codes for eech key ara as follows:

| | |
|---|---|
| C | 0000 |
| C# | 0001 |
| D | 0010 |
| D# | 0011 |
| E | 0100 |
| F | 0101 |
| F# | 0110 |
| G | 0111 |
| G# | 1000 |
| A | 1001 |
| A# | 1010 |
| B | 1011 |
| Not used | 1100 |
| " " | 1101 |
| " " | 1110 |
| " " | 1111 |

| | |
|---|---|
| Octave 1 | 00 |
| Octave 2 | 01 |
| Octave 3 | 10 |
| Octava 4 (High C only) | 11 |

In order to generata these coded outputs, the cir-cuitry on board E is designed to scan the keyboard about 100 times per second. When the scanning cir-cuitry comes to a note which is pressed down by the performer, the number corrasponding to that note is loaded into the 6 bit memory at the output and a gete and trigger pulse are generated.

An oscillator (Z2C, ZBD ZBB and C3) produces a square wave at ebout 150 KHz. The output of the oscillator is fed into a six stage frequency divider (Z4 & Z6). The first four stages of the frequency divider (Z4) are wired to a 'data selector' chip (Z11).

The outputs of the six stage frequency dividers pro-duce a six bit binary word which 'counts' from 00 0000 to 11 111 (0 to 64). The first four divisions

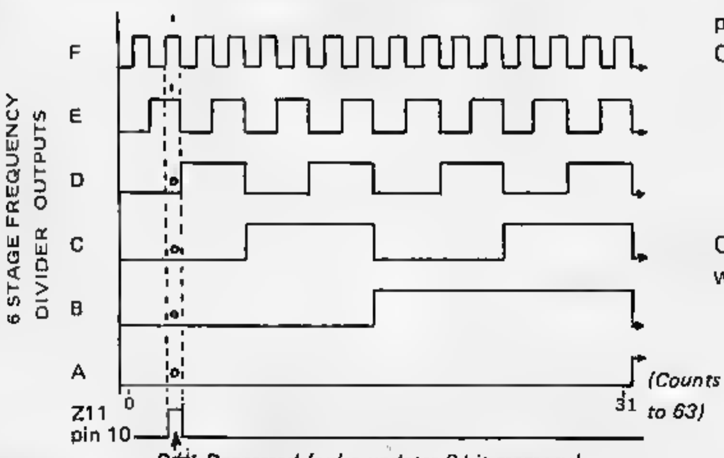
of the frequency divider are connected to the data selector chip which moniters the changing code. The last two divisions (octave information) are decoded so that only one bus rod is enabled at a time (enabled is logic 0).

The inputs of Z11 are wired to the keyboard contacts such that all C's are wired to pin 8, C#s to pin 7 etc. When a key is depressed, one of the outputs of the octave decoder is connected to one of the inputs of the data selector chip. Pin 10 of Z11 will be a logic 1 *only* when the following occurs: 1) A key is depressed (to enable a particular input of Z11), 2) The octave decoder output is enabled (occurs only when the octave code is correct), and 3) The code on pins 11, 13, 14 and 15 matches the enabled input (Example: 'D' input is enabled AND code 0010 is present on the data selector input).

A logic 1 on pin 10 of Z11 indicates that at that instant, the codes on the output of the six stage frequency divider matches the key and octave depressed. The output of Z11 (pin 10) is processed through the strobe gate and the R-S flip flop to update the 6 bit memory by pulsing the clock inputs of the 'D' type flip flops. Thus the outputs of the 6 stage frequency divider are quickly memorized before the number changes.

Since the only time the R-S flip flop changes state is when a key is being depressed, the gate memory circuit monitors the output of the R-S flip flop to provide a gate signal (+5 volts) for as long as a key is depressed. The leading edge of the gate signal (Q bar) is differentiated and processed through the one shot circuit to develop a 15msec. delayed trigger pulse whenever a key is depressed.

When one key is being held, additional triggers are obtained from the 6 bit code change detector. The exclusive OR gates provide pulses to the one shot delay circuit only when the key or octave code change (when a different key is depressed).



*D#1 Depressed (pulse updates 6 bit memory)*

## 6.6 Board F-II & F-III Circuit Description

In order to minimize the number of interconnecting wires between the Voice Select board and the rest of the Pro Soloist, the 15 Voice Select switches are encoded into five bit binary words. In this manner, it is possible to send over five wires all of the information necessary to say which of the 15 switches has been depressed. Separate wires are also brought out for the portamento switch. In addition a Voice select squelch line is also brought out which indicates when none of the switches are on.

**VOICE CODE TRUTH TABLE**

| A = 0 | A = 1 | B | C | D | E |
|---|---|---|---|---|---|
| OFF | OFF | 0 | 0 | 0 | 0 |
| Buzz Bassoon | Bassoon | 0 | 0 | 0 | 1 |
| Saxophone | English Horn | 0 | 0 | 1 | 0 |
| Space Reed | Oboe | 0 | 0 | 1 | 1 |
| Telstar | Clarinet | 0 | 1 | 0 | 0 |
| Song Whistle | Flute | 0 | 1 | 0 | 1 |
| Noze | Tuba | 0 | 1 | 1 | 0 |
| Pulsar | Trombone | 0 | 1 | 1 | 1 |
| Comic Wow | French Horn | 1 | 0 | 0 | 0 |
| Mute Trumpet | Trumpet | 1 | 0 | 0 | 1 |
| Steel Guitar | Cello | 1 | 0 | 1 | 0 |
| Harpsichord | Violin | 1 | 0 | 1 | 1 |
| Space Bass | Electric Bass | 1 | 1 | 0 | 0 |
| Steel Drum | Electric Piano | 1 | 1 | 0 | 1 |
| Country Guitar | Banjo | 1 | 1 | 1 | 0 |
| Fuzz Guitar II | Fuzz Guitar I | 1 | 1 | 1 | 1 |

## 6.7 Board G (Power Supply)

An apparent malfunction of the power supply may be the result of shorts or other problems on other boards in the Pro Soloist. If there is any doubt about the power supply being defective, remove P1 from board C and clip on a set of dummy loads as follows:

+15V to ground: 270 ohm, 1 Watt
-15 V to ground: 330 ohm, 1 Watt
+5 V to ground: 5 ohm, 10 Watt

Observe the following color coding of power supply wires:

+15V = Red
-15V = Violet
+ 5 V = Orange
Ground = Black

| 15 FUZZ GUITAR I<br>14 BANJO<br>13 ELEC. PIANO<br>12 ELEC. BASS | 11 VIOLIN<br>10 CELLO<br>9 TRUMPET<br>8 FR. HORN | 7 TROMBONE<br>6 TUBA<br>5 FLUTE<br>4 CLARINET | 3 OBOE<br>2 ENG. HORN<br>1 BASSOON<br>0 OFF | 16 FUZZ GUITAR II<br>17 COUNTRY GUITAR<br>18 STEEL DRUM<br>19 SPACE BASS | 20 HARPSICHORD<br>21 STEEL GUITAR<br>22 MUTE TRUMPET<br>23 COMIC WOW | 24 PULSAR<br>25 NOZE<br>26 SONG WHISTLE<br>27 TELSTAR | 28 SPACE REED<br>29 SAX<br>30 BUZZ BASSOON<br>0 OFF | | PIN | BOARD A Z15 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 0 0 1 | 0 0 0 0 | 0 0 0 0 | 0 0 0 1 | 1 0 0 0 | 0 0 0 0 | 0 0 0 0 | 0 1 0 1 | | 9 | LOGIC 1 SELECT DYNAMIC PULSE |
| 0 0 0 0 | 0 0 0 0 | 0 0 0 0 | 1 1 1 1 | 1 1 0 1 | 1 0 0 0 | 0 1 0 0 | 1 0 1 1 | | 7 | LOGIC 1 SELECT 1/14 PULSE |
| 0 1 1 0 | 0 0 0 0 | 0 0 0 0 | 0 0 0 1 | 1 0 0 0 | 0 1 0 0 | 1 0 0 0 | 0 1 0 1 | | 6 | LOGIC 1 SELECT 1/9 PULSE |
| 0 0 0 0 | 0 0 0 0 | 0 0 0 0 | 0 0 0 1 | 1 0 0 0 | 0 0 1 0 | 0 1 0 0 | 0 0 1 1 | | 5 | LOGIC 1 SELECT 1/64 PULSE |
| 0 0 0 0 | 0 0 0 0 | 0 0 0 1 | 0 0 0 1 | 0 0 1 0 | 0 0 0 0 | 0 0 1 1 | 0 0 0 1 | | 4 | LOGIC 1 SELECT 1/2 PULSE |
| 0 0 0 0 | 1 1 0 0 | 0 0 0 0 | 0 0 0 1 | 0 0 0 0 | 0 0 0 1 | 0 1 0 0 | 0 0 0 1 | | 3 | LOGIC 1 SELECT 2/11 PULSE |
| 1 1 1 1 | 0 0 1 1 | 0 1 0 1 | 0 1 0 1 | 0 1 1 1 | 1 1 1 1 | 1 0 0 1 | 0 1 1 1 | | 2 | LOGIC 1 ENABLE DOWN 1 OCTAVE |
| 0 0 0 1 | 0 1 0 0 | 1 1 0 0 | 0 0 1 1 | 1 1 0 1 | 0 0 0 0 | 0 1 0 0 | 0 0 1 1 | | 1 | LOGIC 1 ENABLE DOWN 2 OCTAVES |
| E: - 0 - 0 | - 0 - 0 | - 0 - 0 | - 0 - 0 | - 0 - 0 | - 0 - 0 | - 0 - 0 | - 0 - 0 | 12 | | |
| D: - - 0 0 | - - 0 0 | - - 0 0 | - - 0 0 | - - 0 0 | - - 0 0 | - - 0 0 | - - 0 0 | 11 | | |
| C: - - - - | 0 0 0 0 | - - - - | 0 0 0 0 | - - - - | 0 0 0 0 | - - - - | 0 0 0 0 | 12 | | BOARD B Z1 |
| B: - - - - | - - - - | 0 0 0 0 | 0 0 0 0 | - - - - | - - - - | 0 0 0 0 | 0 0 0 0 | 13 | | |
| A: - - - - | - - - - | - - - - | - - - - | 0 0 0 0 | 0 0 0 0 | 0 0 0 0 | 0 0 0 0 | 14 | | |
| 0 1 1 1 | 0 0 1 1 | 1 1 1 1 | 1 0 1 0 | 0 0 1 1 | 0 1 1 0 | 1 0 1 1 | 0 0 0 0 | (9ATTRS) | 9 | LOGIC 1 ENABLE VCA ATTENUATOR |
| 0 0 0 0 | 1 1 1 1 | 1 1 1 1 | 1 0 0 1 | 0 0 1 1 | 0 0 1 0 | 1 0 1 0 | 1 1 1 1 | | 7 | LOGIC 1 SELECT ADSR S/R B |
| 1 0 1 1 | 1 1 1 1 | 1 1 1 1 | 1 0 0 1 | 1 1 0 0 | 1 1 1 1 | 1 1 1 1 | 1 1 1 1 | | 6 | LOGIC 1 SELECT ADSR S/R A |
| 1 1 0 1 | 0 1 0 1 | 0 0 0 0 | 1 0 0 1 | 0 1 1 0 | 0 1 1 0 | 1 1 0 1 | 0 0 0 1 | | 5 | LOGIC 1 SELECT ADSR RELEASE C |
| 1 0 1 1 | 0 0 1 0 | 0 0 0 0 | 1 0 0 1 | 1 1 1 0 | 1 1 1 0 | 1 0 1 1 | 0 0 0 1 | | 4 | LOGIC 1 SELECT ADSR RELEASE B |
| 1 0 1 1 | 0 0 0 0 | 1 0 1 0 | 1 0 0 1 | 1 1 1 0 | 1 1 0 0 | 1 1 0 1 | 1 0 0 1 | | 3 | LOGIC 1 SELECT ADSR RELEASE A |
| 0 0 0 1 | 1 1 1 1 | 1 1 1 1 | 1 0 0 1 | 0 0 0 0 | 1 0 0 0 | 1 0 1 1 | 0 1 1 1 | | 2 | LOGIC 1 SELECT ADSR SUSTAIN B |
| 0 0 1 1 | 1 1 0 1 | 0 0 1 0 | 1 0 0 1 | 0 0 0 0 | 0 1 1 0 | 0 0 1 1 | 1 1 0 1 | | 1 | LOGIC 1 SELECT ADSR SUSTAIN A |
| | | | | | | | | | | BOARD B Z2 |
| 0 0 0 0 | 1 1 0 0 | 0 0 0 0 | 0 0 0 1 | 1 1 0 0 | 0 1 0 1 | 1 0 0 0 | 0 0 0 1 | | 9 | LOGIC 1 SELECT ADSR DECAY B |
| 0 0 1 0 | 1 0 0 0 | 0 0 0 0 | 0 0 0 1 | 0 1 0 0 | 0 1 0 1 | 1 1 1 1 | 0 0 0 1 | | 7 | LOGIC 1 SELECT ADSR DECAY A |
| 1 1 0 0 | 0 1 1 0 | 1 0 1 1 | 1 0 0 0 | 0 1 0 1 | 0 0 1 0 | 0 0 1 0 | 0 0 0 0 | | 6 | LOGIC 1 SELECT ADSR ATTACK C |
| 1 1 0 1 | 0 0 1 0 | 1 0 0 1 | 1 0 0 0 | 0 1 0 1 | 0 0 0 0 | 0 1 0 0 | 0 1 1 0 | | 5 | LOGIC 1 SELECT ADSR ATTACK B |
| 1 1 1 1 | 0 0 0 0 | 0 0 0 0 | 1 0 0 0 | 1 1 1 1 | 1 1 0 0 | 0 0 0 1 | 1 0 0 0 | | 4 | LOGIC 1 SELECT ADSR ATTACK A |
| 0 0 0 0 | 0 1 0 0 | 0 1 1 0 | 0 0 0 1 | 0 1 0 0 | 1 1 0 0 | 1 0 0 0 | 1 0 1 1 | | 3 | LOGIC 1 SELECT AR RELEASE A |
| 1 0 0 0 | 1 1 1 0 | 1 1 1 1 | 1 1 1 0 | 1 1 1 0 | 1 1 1 1 | 0 1 0 0 | 0 1 1 0 | | 2 | LOGIC 1 SELECT AR ATTACK B |
| 1 1 0 0 | 0 0 0 0 | 0 0 1 1 | 0 0 0 0 | 0 1 0 0 | 1 1 0 0 | 0 0 0 0 | 0 0 0 0 | | 1 | LOGIC 1 SELECT AR ATTACK A |
| | | | | | | | | | | BOARD B Z3 |
| 0 0 1 1 | 1 0 1 1 | 1 1 0 0 | 0 0 0 0 | 1 1 1 1 | 1 0 1 1 | 0 0 0 1 | 1 0 1 0 | | 9 | LOGIC 1 SELECT VCF ENV. ATTEN. D |
| 0 0 1 0 | 1 0 1 0 | 1 1 0 0 | 0 0 0 0 | 1 1 1 1 | 1 1 1 1 | 1 0 0 1 | 1 0 1 0 | | 7 | LOGIC 1 SELECT VCF ENV. ATTEN. C |
| 1 1 1 1 | 1 1 1 0 | 1 1 1 1 | 0 0 0 0 | 1 1 1 1 | 1 1 1 1 | 1 1 0 1 | 1 1 0 0 | | 6 | LOGIC 1 SELECT VCF ENV. ATTEN. B |
| 1 1 1 1 | 1 0 1 1 | 1 1 1 1 | 1 0 0 0 | 1 1 1 1 | 1 1 1 1 | 1 1 0 1 | 1 1 0 0 | | 5 | LOGIC 1 SELECT VCF ENV. ATTEN. A |
| 0 0 1 1 | 0 0 1 1 | 1 1 1 1 | 1 0 0 0 | 1 1 1 1 | 1 1 1 1 | 1 1 0 1 | 1 1 1 0 | | 4 | LOGIC 1 ROUTE ADSR TO VCF |
| 0 1 1 1 | 1 1 1 1 | 0 0 1 1 | 0 0 0 0 | 1 1 1 1 | 1 1 1 1 | 1 1 1 1 | 1 1 1 0 | | 3 | LOGIC 1 ROUTE ADSR TO VCA |
| 1 1 0 0 | 1 1 0 0 | 0 0 0 0 | 0 0 0 0 | 1 0 0 1 | 0 0 0 0 | 0 0 0 0 | 0 0 1 0 | | 2 | LOGIC 1 ROUTE AR TO VCF |
| 1 0 0 0 | 0 0 0 0 | 1 1 0 0 | 1 1 1 0 | 1 1 0 0 | 0 0 1 1 | 0 1 0 0 | 0 0 0 0 | | 1 | LOGIC 1 ROUTE AR TO VCA |

ADDRESS

| | FUZZ GUITAR I<br>BANJO<br>ELEC. PIANO<br>ELEC. BASS | VIOLIN<br>CELLO<br>TRUMPET<br>FR. HORN | TROMBONE<br>TUBA<br>FLUTE<br>CLARINET | OBOE<br>ENG. HORN<br>BASSOON<br>OFF | FUZZ GUITAR II<br>COUNTRY GUITAR<br>STEEL DRUM<br>SPACE BASS | HARPSICHORD<br>STEEL GUITAR<br>MUTE TRUMPET<br>COMIC WOW | PULSAR<br>NOZE<br>SONG WHISTLE<br>TELSTAR | SPACE REED<br>SAX<br>BUZZ BASSOON<br>OFF | PIN | BOARD C Z6 |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 0 1 1 | 0 1 1 1 | 1 1 1 1 | 0 0 0 1 | 1 1 1 1 | 1 1 1 0 | 1 0 0 0 | 1 1 1 1 | 9 | LOGIC 1 SELECT MAX. FILTER RES. |
| | 0 0 1 1 | 0 1 1 0 | 1 0 1 1 | 0 0 0 1 | 1 1 0 1 | 0 0 1 0 | 0 0 0 0 | 0 0 0 1 | 7 | LOGIC 1 SELECT MED. FILTER RES. |
| | 0 0 1 1 | 1 1 0 0 | 0 1 0 0 | 0 0 0 1 | 0 1 0 1 | 1 0 0 0 | 0 0 0 0 | 0 0 0 1 | 6 | LOGIC 1 SELECT NO FILTER RES. |
| | 0 1 1 1 | 1 1 1 1 | 1 0 1 1 | 1 0 1 1 | 1 1 1 1 | 1 1 1 1 | 0 1 1 1 | 0 1 1 1 | 5 | LOGIC 0 ENABLE NO TRACK |
| | 1 1 1 1 | 1 1 1 1 | 1 1 1 1 | 1 0 0 1 | 1 0 0 0 | 1 1 1 1 | 0 1 1 1 | 0 0 1 1 | 4 | LOGIC 0 ENABLE TRACK 5 V/OCT |
| | 1 0 0 0 | 0 0 0 0 | 0 1 0 0 | 0 0 0 1 | 0 1 1 1 | 1 0 0 0 | 0 0 1 0 | 0 0 0 1 | 3 | LOGIC 0 ENABLE TRACK 2V/OCT |
| | 0 0 0 1 | 0 0 1 0 | 0 0 0 1 | 0 0 0 1 | 1 1 0 1 | 0 0 1 0 | 1 1 0 0 | 0 0 0 1 | 2 | LOGIC 0 ENABLE FILTER OFFSET B |
| | 0 1 1 1 | 0 0 0 1 | 1 1 1 0 | 0 0 0 1 | 1 0 1 1 | 0 0 0 1 | 0 0 0 1 | 0 0 0 1 | 1 | LOGIC 0 ENABLE FILTER OFFSET A |
| E | – 0 – 0 | – 0 – 0 | – 0 – 0 | – 0 – 0 | – 0 – 0 | – 0 – 0 | – 0 – 0 | – 0 – 0 | 15 | |
| D | – – 0 0 | – – 0 0 | – – 0 0 | – – 0 0 | – – 0 0 | – – 0 0 | – – 0 0 | – – 0 0 | 11 | BOARD C Z7 |
| C | – – – – | 0 0 0 0 | – – – – | 0 0 0 0 | – – – – | 0 0 0 0 | – – – – | 0 0 0 0 | 12 | |
| B | – – – – | – – – – | 0 0 0 0 | 0 0 0 0 | – – – – | – – – – | 0 0 0 0 | 0 0 0 0 | 13 | |
| A | – – – – | – – – – | – – – – | – – – – | 0 0 0 0 | 0 0 0 0 | 0 0 0 0 | 0 0 0 0 | 14 | |
| | 1 1 1 1 | 1 1 1 1 | 1 1 1 1 | 1 0 1 1 | 1 1 1 0 | 0 1 1 1 | 1 1 1 1 | 1 0 0 1 | 9 | LOGIC 0 ENABLE E. HORN & NO. 2 RES. |
| | 0 1 1 1 | 0 0 0 0 | 0 0 0 0 | 1 1 0 1 | 0 0 0 1 | 0 1 1 0 | 0 0 0 0 | 0 0 0 1 | 7 | LOGIC 1 ENABLE PULSE +10 dB |
| | 1 1 0 0 | 1 1 0 0 | 0 0 0 1 | 0 0 1 1 | 1 1 1 0 | 1 0 1 1 | 0 1 1 1 | 1 1 1 1 | 6 | LOGIC 1 ROUTE PULSE TO HPF INPUT |
| | 1 0 0 0 | 0 0 1 1 | 1 1 1 0 | 0 0 0 1 | 0 0 0 0 | 0 0 0 0 | 1 1 0 0 | 1 0 1 1 | 5 | LOGIC 1 ROUTE SAWTOOTH TO HPF |
| | 0 0 0 0 | 0 0 0 0 | 0 0 0 0 | 0 0 0 1 | 0 0 1 0 | 0 0 0 0 | 0 0 1 1 | 0 0 1 1 | 4 | LOGIC 1 ENABLE HPF D |
| | 1 0 0 0 | 0 0 0 1 | 0 1 0 0 | 0 0 0 1 | 0 0 1 0 | 0 0 0 0 | 0 0 0 0 | 0 0 0 1 | 3 | LOGIC 1 ENABLE HPF C |
| | 0 1 0 0 | 0 0 1 1 | 1 0 1 0 | 0 0 1 1 | 1 1 0 0 | 1 0 0 1 | 1 1 0 0 | 1 1 1 1 | 2 | LOGIC 1 ENABLE HPF B |
| | 0 0 0 0 | 1 1 0 0 | 0 0 0 1 | 0 0 1 1 | 0 0 0 0 | 1 0 1 1 | 1 1 0 0 | 1 0 0 1 | 1 | LOGIC 1 ENABLE HPF A |
| | | | | | | | | | | BOARD C Z8 |
| | 0 1 1 1 | 0 0 0 0 | 0 0 0 1 | 1 0 0 1 | 1 1 1 1 | 1 1 1 0 | 1 0 0 0 | 1 1 1 1 | 9 | LOGIC 1 ROUTE NO. 3 RES. TO VCF |
| | 1 0 0 0 | 1 1 0 0 | 0 0 0 0 | 0 0 0 1 | 1 0 0 0 | 0 0 0 0 | 1 0 0 0 | 1 0 1 1 | 7 | LOGIC 1 ROUTE NO. 3 RES. TO VCA |
| | 1 0 0 0 | 0 0 0 0 | 0 0 0 1 | 1 0 0 1 | 1 1 0 0 | 1 0 1 0 | 0 0 0 0 | 0 0 0 1 | 6 | LOGIC 1 ENABLE OBOE RESONATOR |
| | 1 0 0 1 | 0 0 1 1 | 1 1 1 0 | 0 1 1 1 | 0 1 0 0 | 0 0 0 0 | 0 0 0 0 | 0 0 1 1 | 5 | LOGIC 1 ENABLE E. BASS RESONATOR |
| | 1 0 1 0 | 0 0 0 0 | 0 0 0 0 | 0 0 0 1 | 0 1 0 1 | 0 1 0 0 | 1 0 0 0 | 1 0 0 1 | 4 | LOGIC 1 ENABLE E. PIANO RESONATOR |
| | 0 1 0 0 | 1 0 0 0 | 0 0 0 0 | 0 0 0 1 | 1 0 1 0 | 0 0 0 0 | 0 0 0 0 | 0 1 1 1 | 3 | LOGIC 1 ENABLE VIOLIN 1 RESONATOR |
| | 0 1 1 1 | 1 0 1 1 | 1 1 1 1 | 1 1 1 1 | 1 1 1 1 | 1 1 1 1 | 1 1 1 1 | 1 1 1 1 | 2 | LOGIC 0 ENABLE RES. 1&2, CELLO 1,2 &3 |
| | 1 1 1 1 | 0 1 1 1 | 1 1 1 1 | 1 1 1 1 | 0 1 1 1 | 1 1 1 1 | 1 0 1 1 | 0 1 0 1 | 1 | LOGIC 0 ENABLE RES. 1 & 2, VIOLIN 2,3 |
| | | | | | | | | | | BOARD D Z1 |
| | 0 0 0 0 | 0 0 0 0 | 0 1 0 0 | 0 0 0 1 | 0 0 0 0 | 0 0 0 0 | 0 0 0 0 | 0 0 0 1 | 9 | LOGIC 1 ENABLE GROWL B MAX |
| | 0 0 0 0 | 0 0 1 0 | 1 1 0 0 | 0 0 0 1 | 0 0 0 0 | 0 0 1 0 | 0 0 0 0 | 0 0 0 1 | 7 | LOGIC 1 ENABLE GROWL A [+B] |
| | 0 0 0 0 | 0 0 0 0 | 0 0 1 1 | 1 0 0 1 | 0 0 0 0 | 0 0 0 0 | 1 0 0 1 | 0 0 0 1 | 6 | LOGIC 1 ENABLE VIBRATO C MIN. |
| | 1 0 0 0 | 0 0 0 0 | 1 0 1 0 | 1 1 1 1 | 0 1 0 0 | 0 1 0 1 | 1 0 0 1 | 0 1 0 1 | 5 | LOGIC 1 ENABLE VIBRATO B MED. |
| | 1 0 0 0 | 1 1 0 0 | 1 0 0 0 | 0 0 0 1 | 0 0 0 0 | 0 1 0 0 | 1 0 0 1 | 0 0 0 1 | 4 | LOGIC 1 ENABLE VIBRATO A MAX. |
| | 1 1 0 0 | 1 1 1 1 | 1 0 0 1 | 1 1 1 1 | 1 0 0 1 | 1 1 1 1 | 0 1 0 0 | 0 1 1 1 | 3 | LOGIC 1 ENABLE VIBRATO, 0=TREMOLO |
| | 0 0 1 1 | 0 0 1 1 | 1 1 1 0 | 0 0 0 1 | 0 1 1 0 | 0 0 1 1 | 0 1 1 0 | 1 0 0 1 | 2 | LOGIC 1 ENABLE FILTER OFFSET C [D] |
| | 0 0 1 1 | 0 0 1 0 | 1 0 0 0 | 0 0 0 1 | 0 1 0 0 | 0 0 0 1 | 0 1 1 0 | 1 0 0 1 | 1 | LOGIC 1 ENABLE FILTER OFFSET D |

ADDRESS

M58

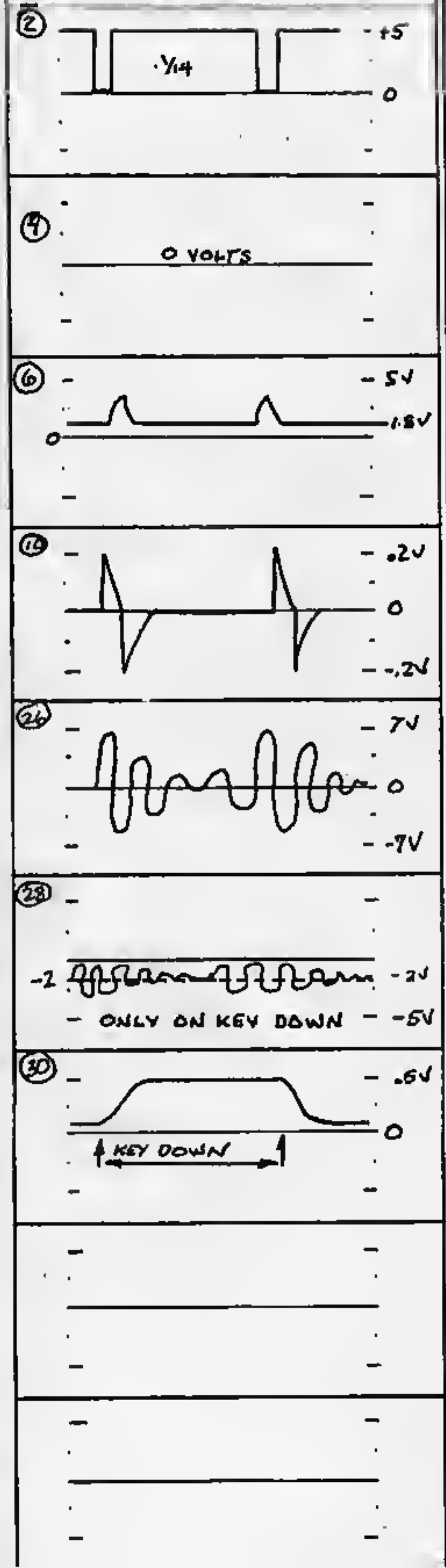
(7ATA5)

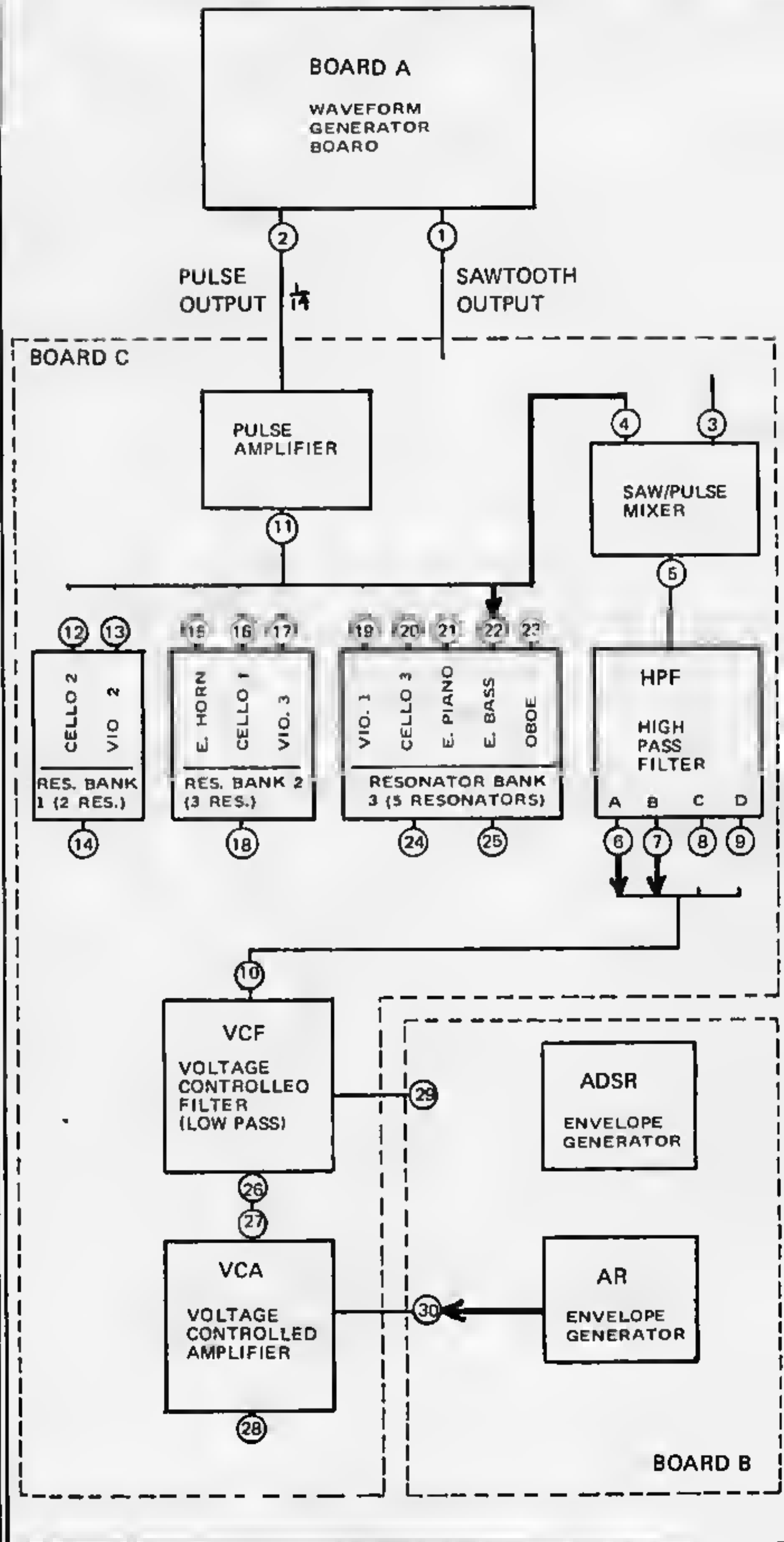
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 1 | 0 | 0 | 0 | 1 |

# 2701 VOICE FLOW CHART

VOICE: BASSOON ①

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



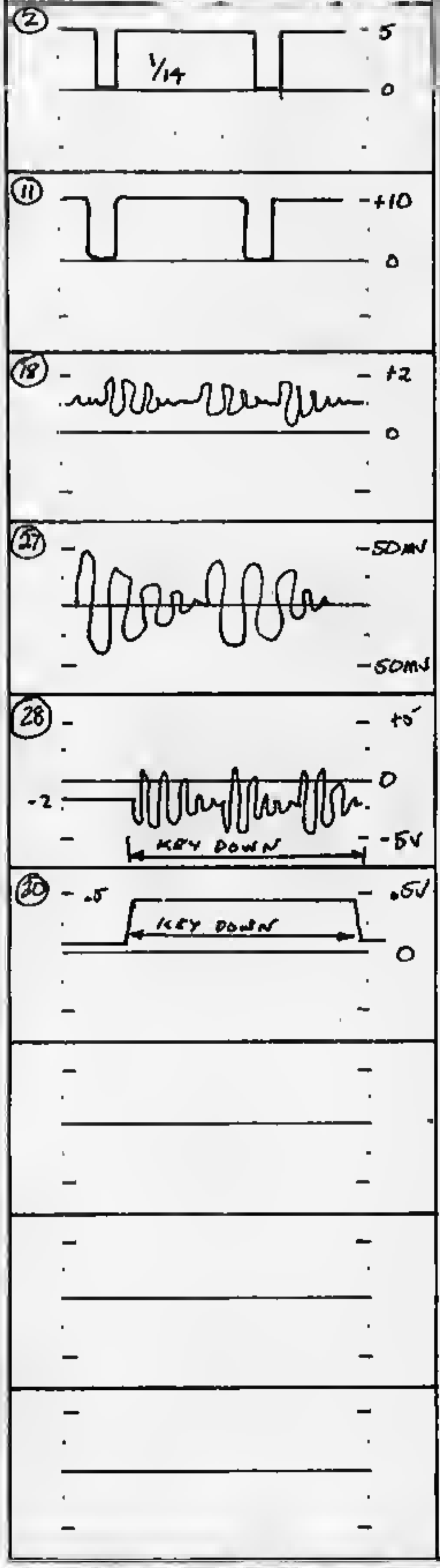



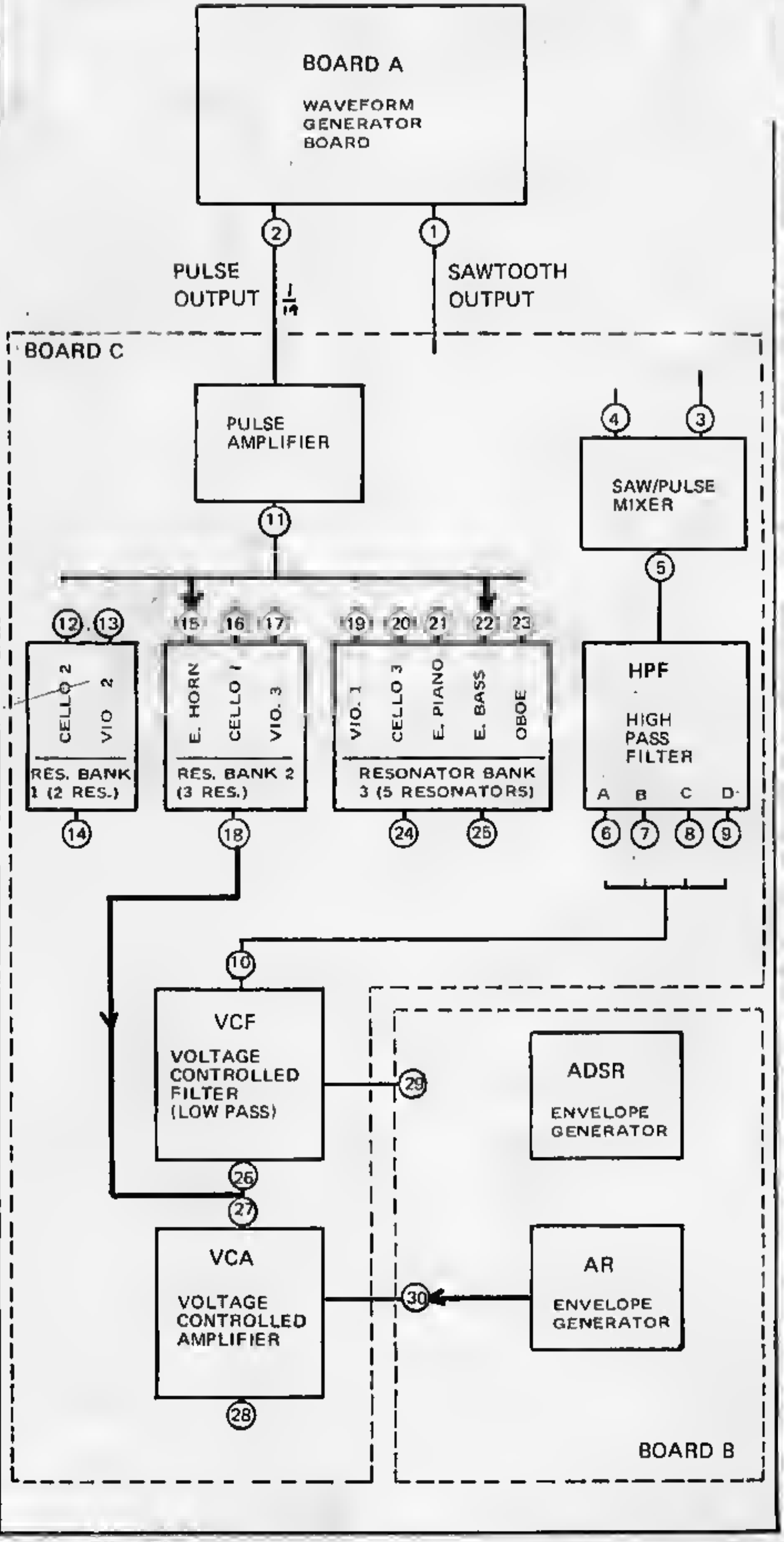
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 1 | 0 | 0 | 1 | 0 |

# 2701 VOICE FLOW CHART

**VOICE: ENG. HORN** ②

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



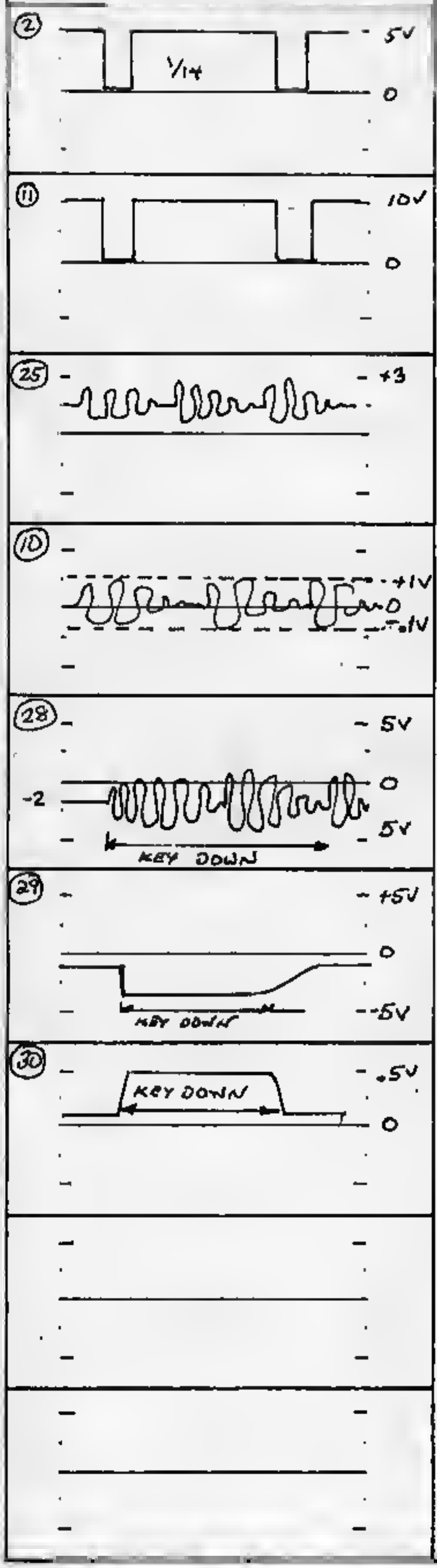



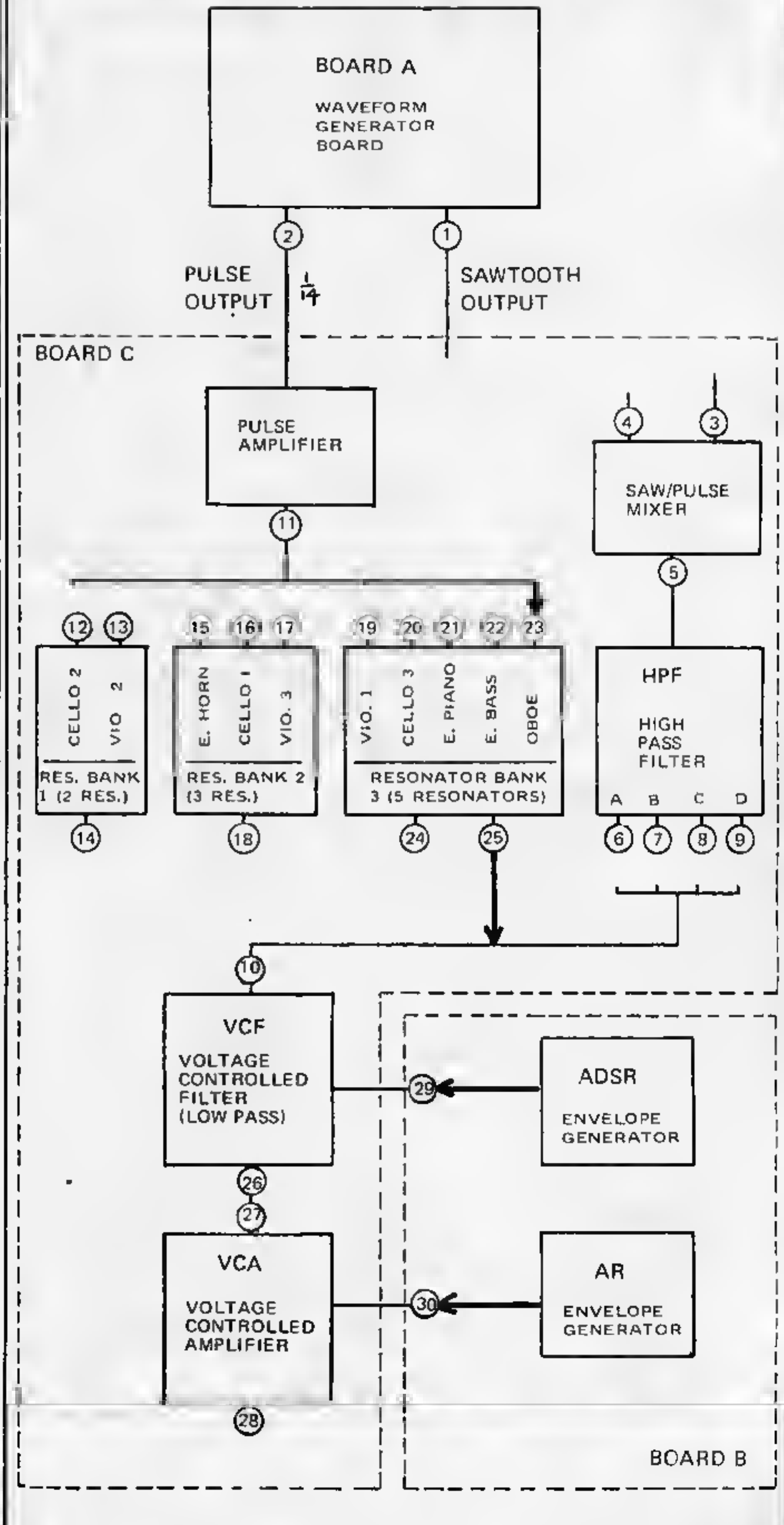
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 1 | 0 | 0 | 1 | 1 |

# 2701 VOICE FLOW CHART

VOICE: OBOE ③

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



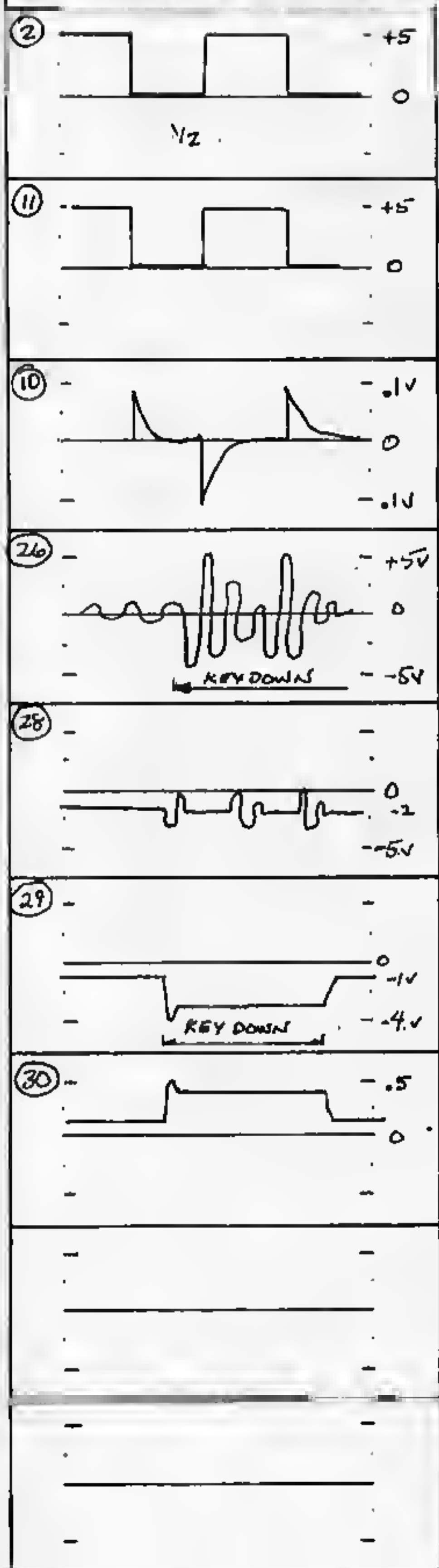



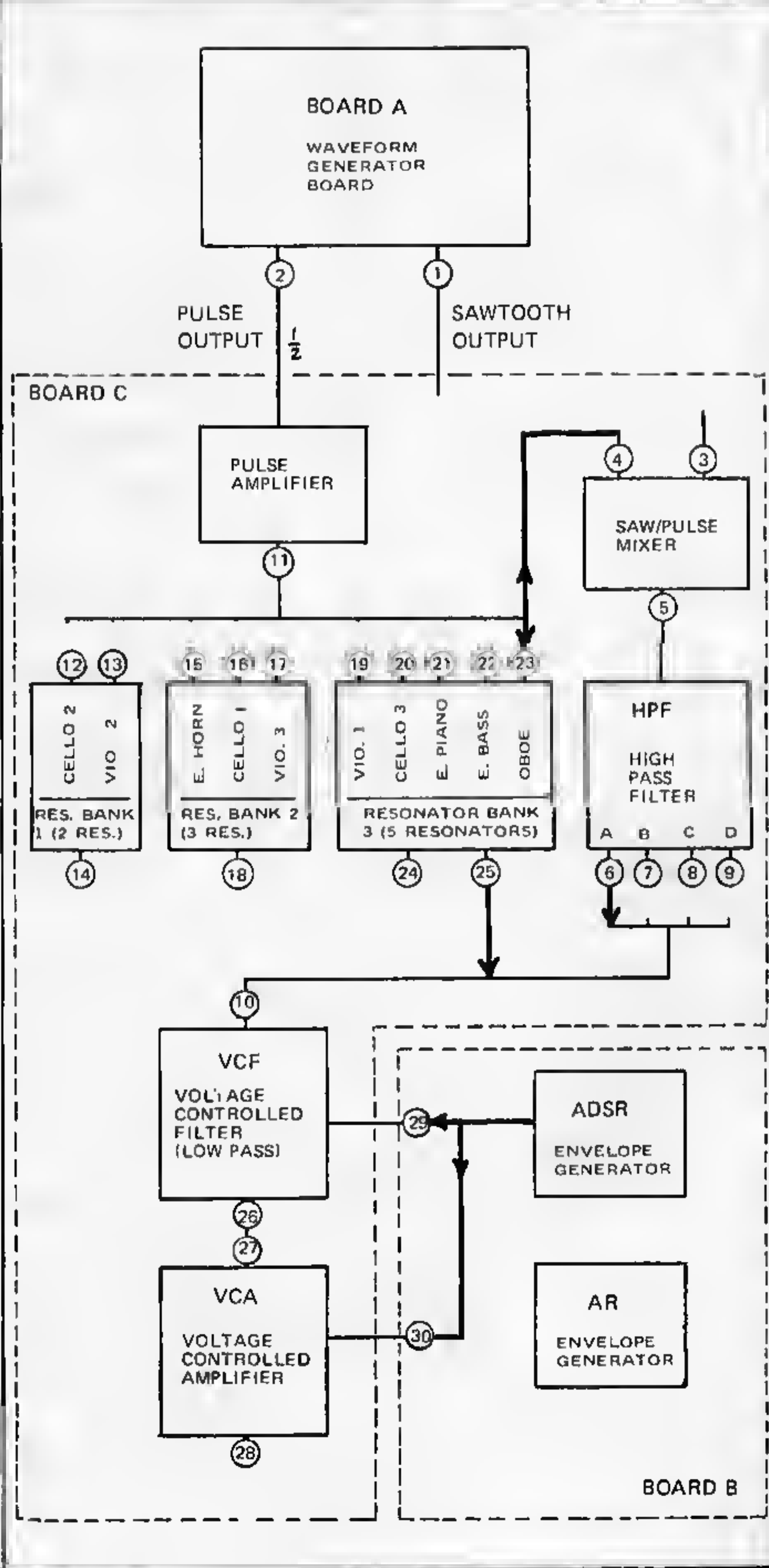
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 1 | 0 | 1 | 0 | 0 |

## 2701 VOICE FLOW CHART

**VOICE: CLARINET 9**

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



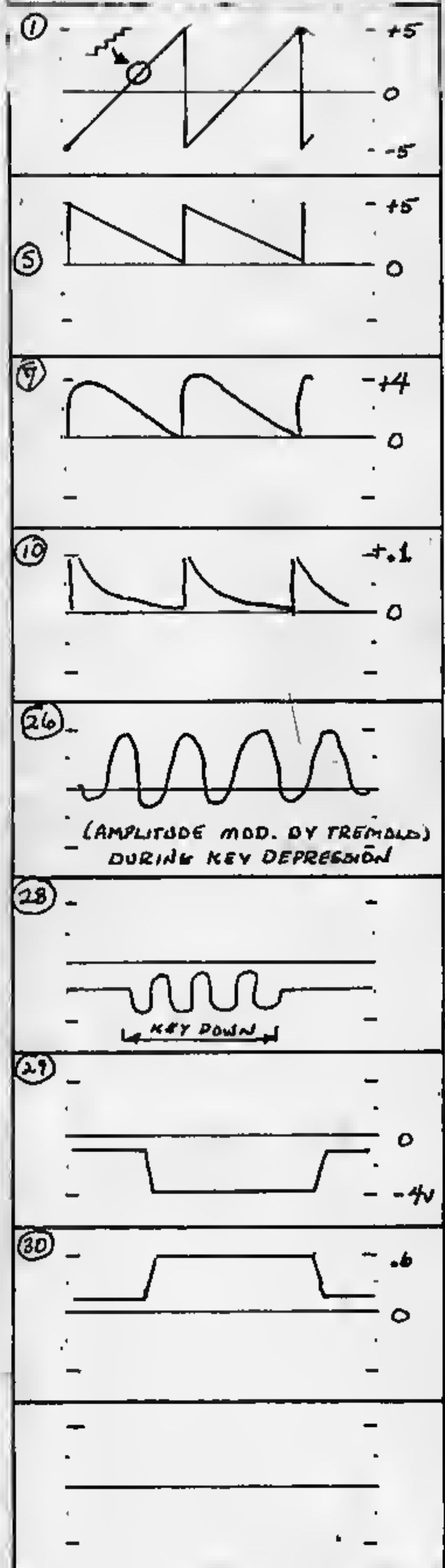



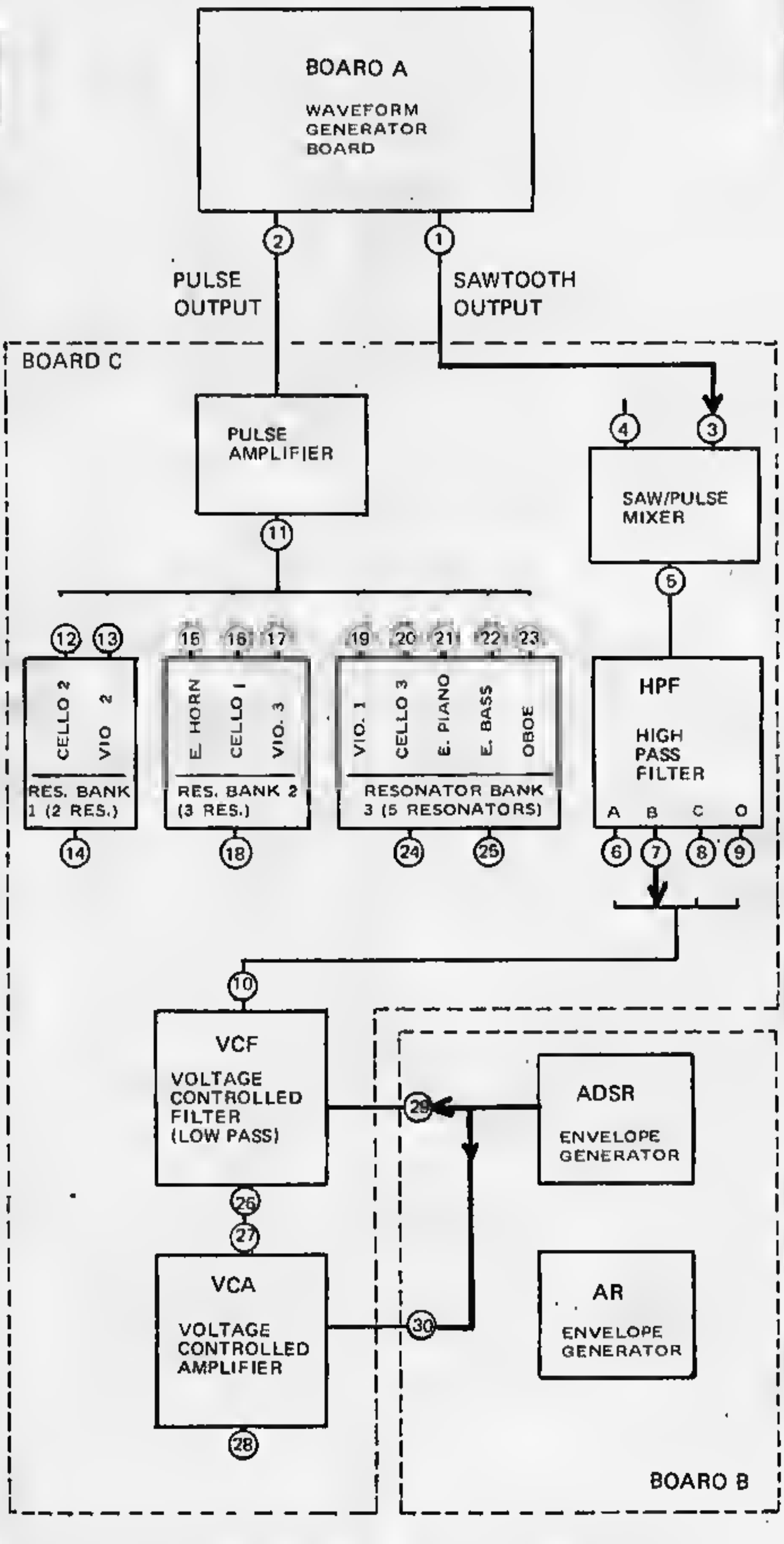
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 1 | 0 | 1 | 0 | 1 |

# 2701 VOICE FLOW CHART

## VOICE: FLUTE ©

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.

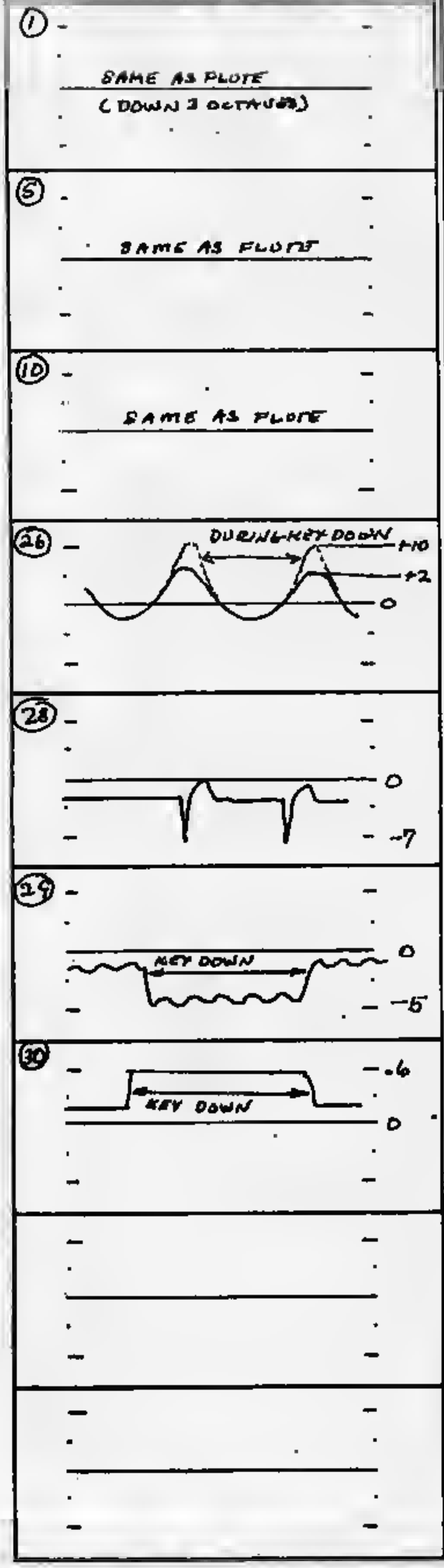


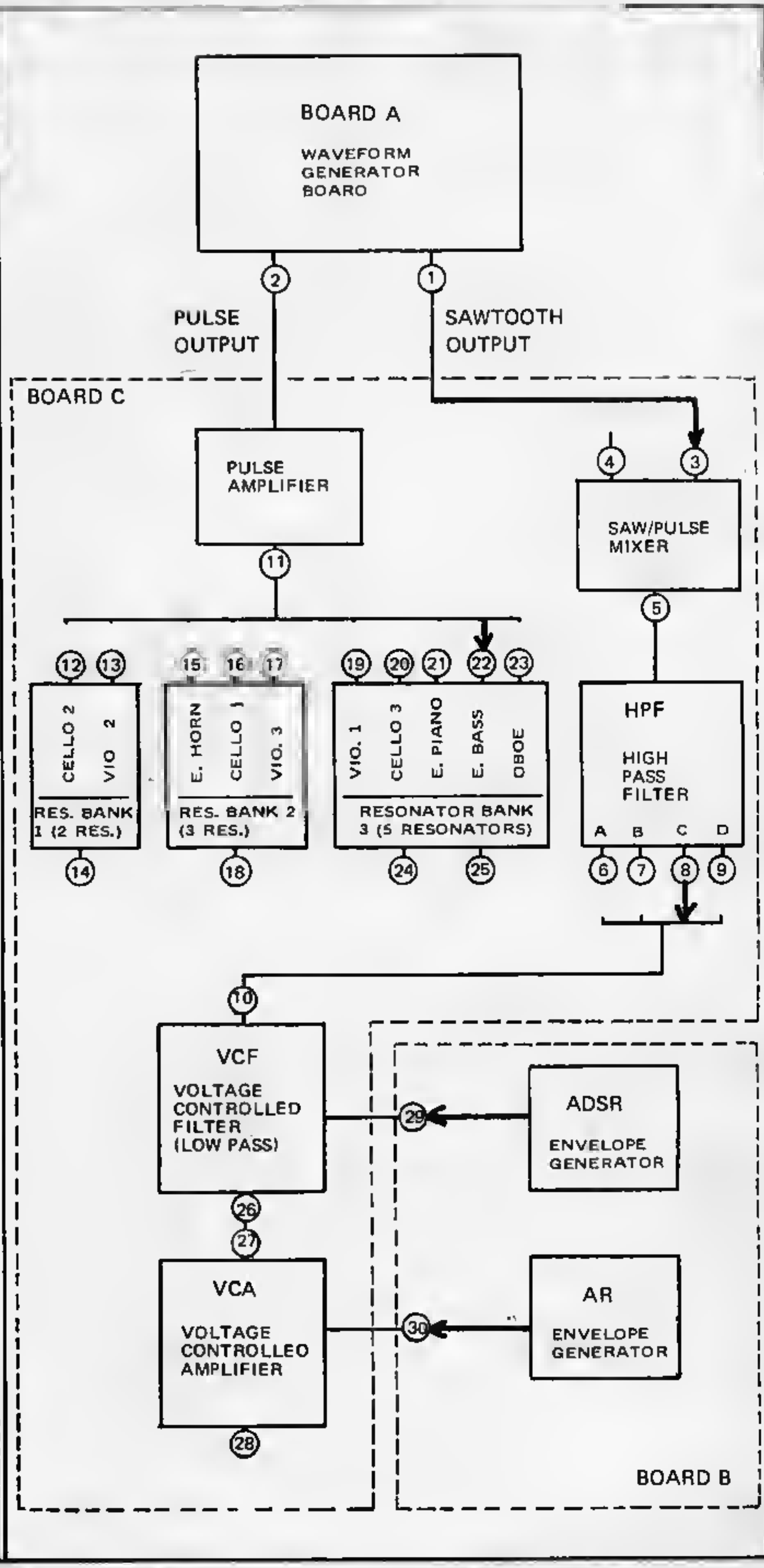



| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 1 | 0 | 1 | 1 | 0 |

# 2701 VOICE FLOW CHART — VOICE: TUBA ⑥

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



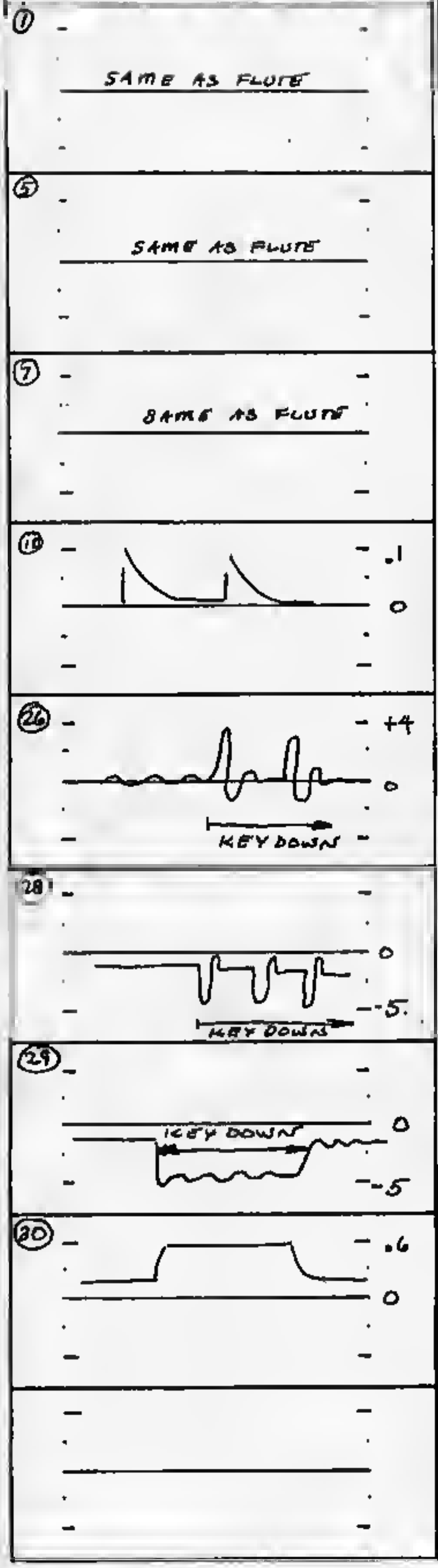
VOICE CODE

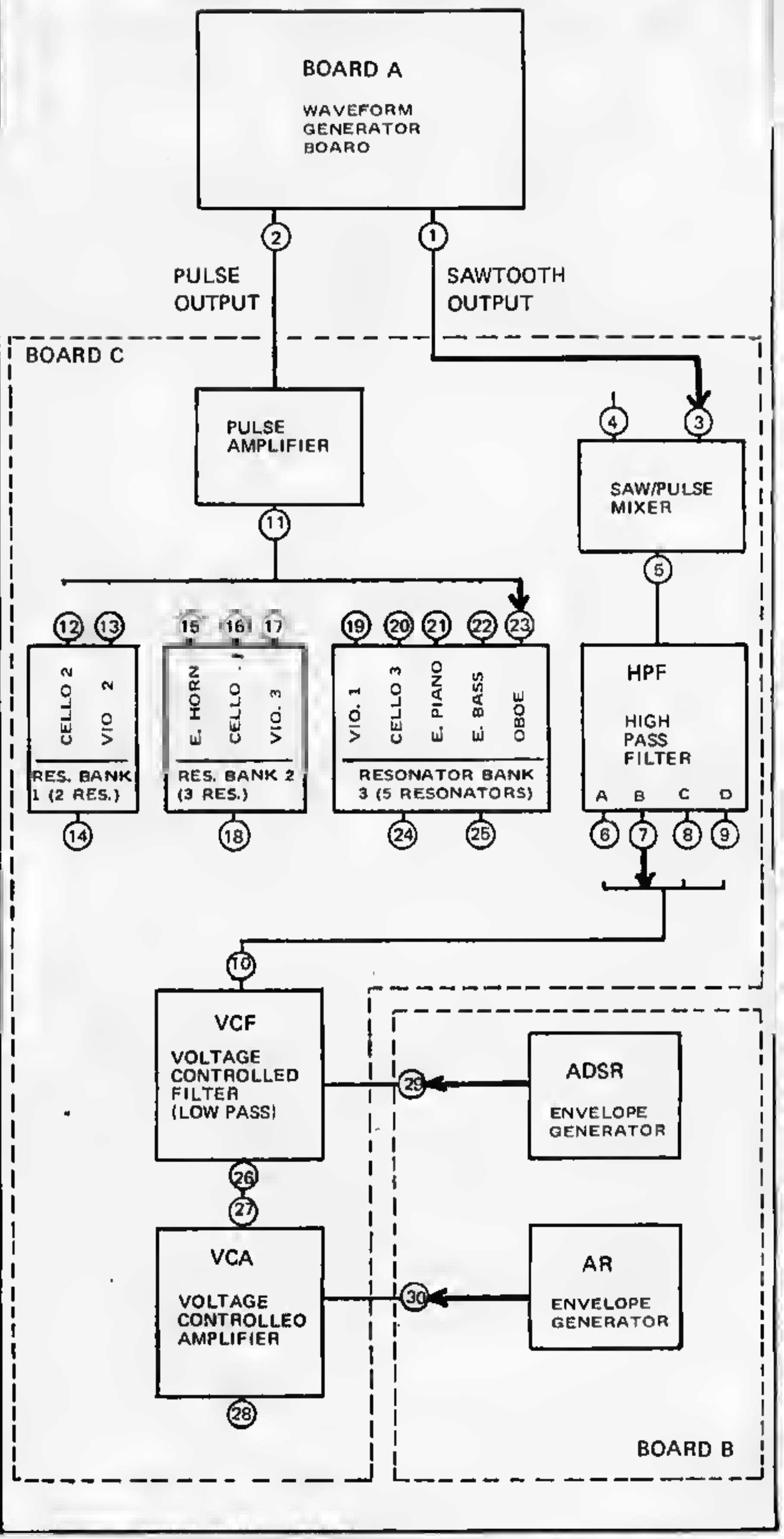
| A | B | C | D | E |
|---|---|---|---|---|
| 1 | 0 | 1 | 1 | 1 |

# 2701 VOICE FLOW CHART

VOICE: TROMBONE ⑦

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



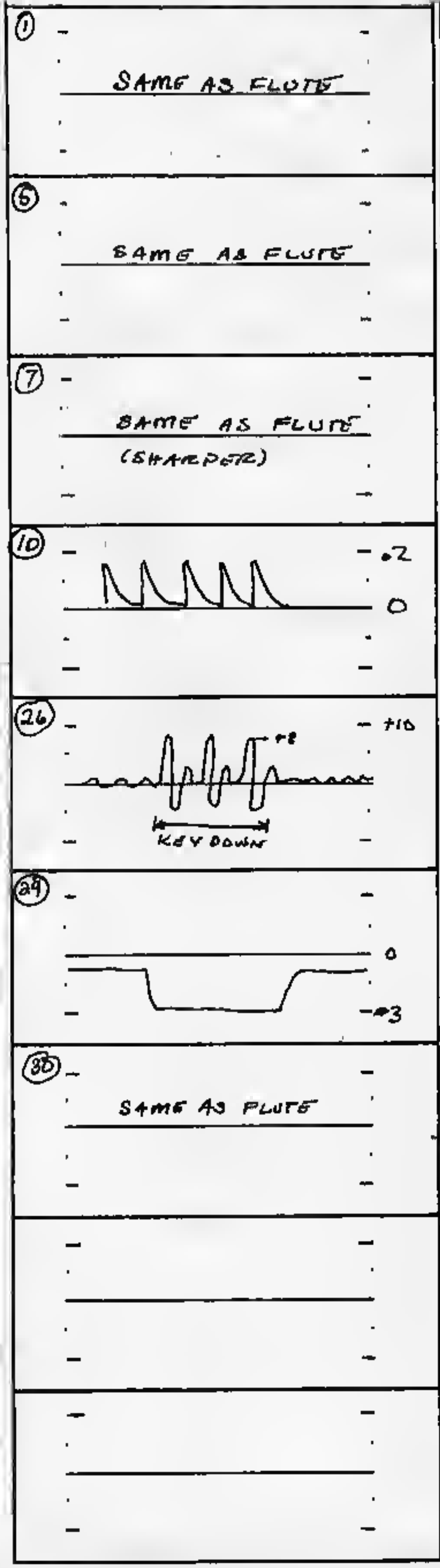



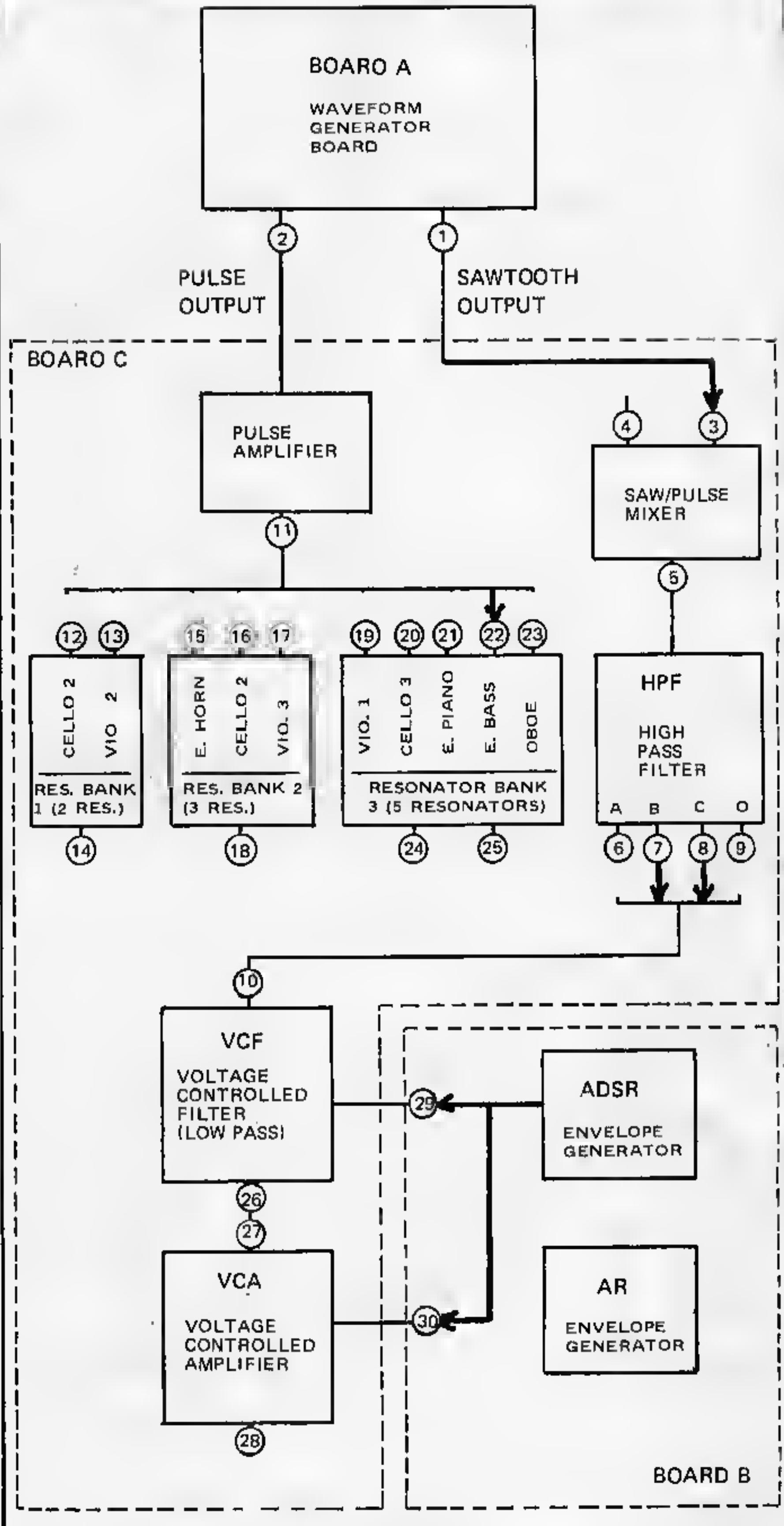
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 1 | 1 | 0 | 0 | 0 |

# 2701 VOICE FLOW CHART

**VOICE: FR. HORN®**

2701 BOARO TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.

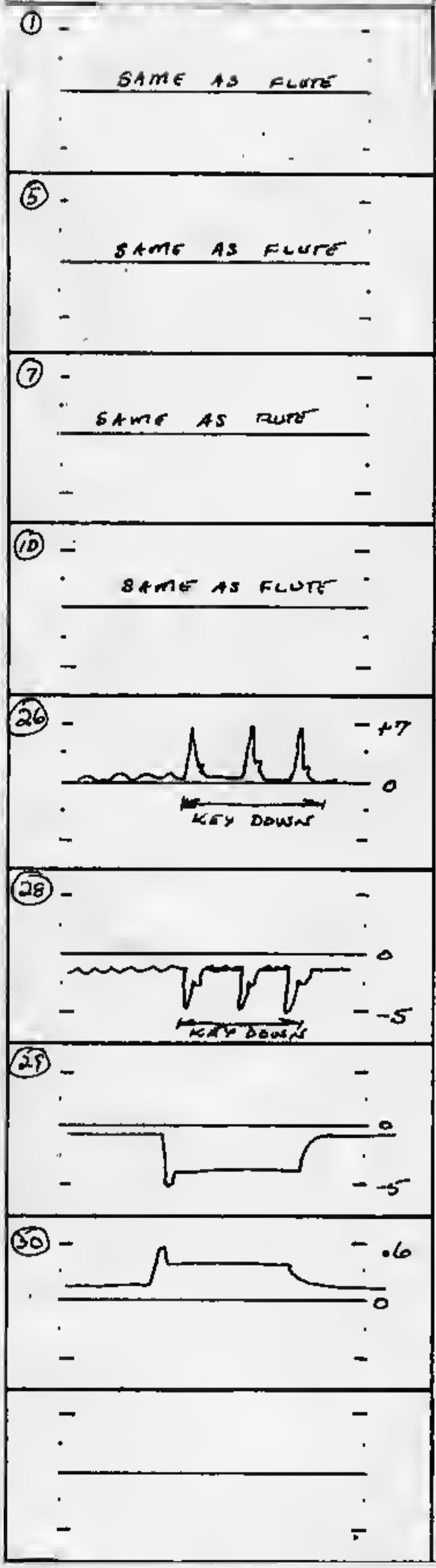


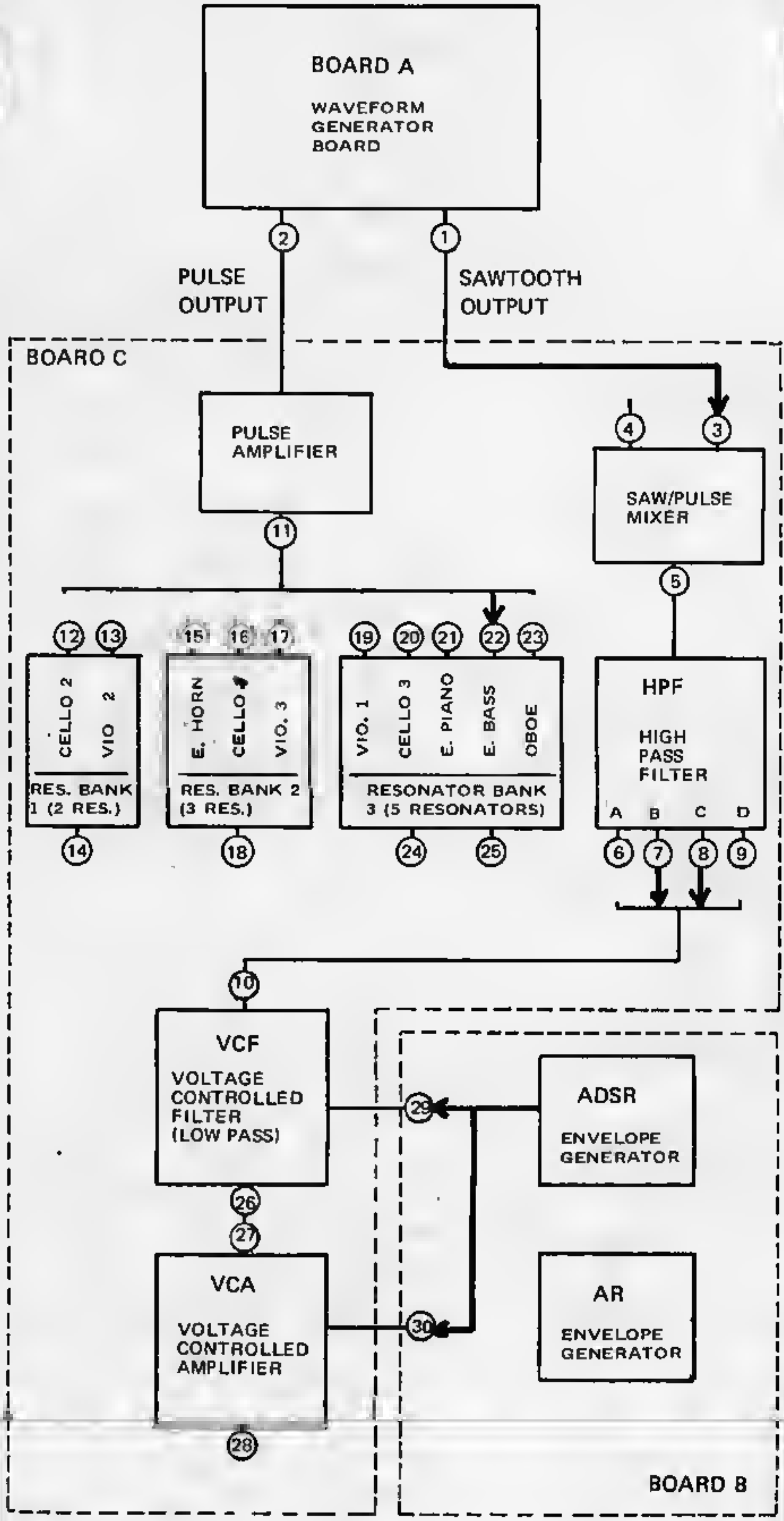



| VDICE CDDE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 1 | 1 | 0 | 0 | 1 |

**2701 VOICE FLOW CHART** **VOICE: TRUMPET**

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



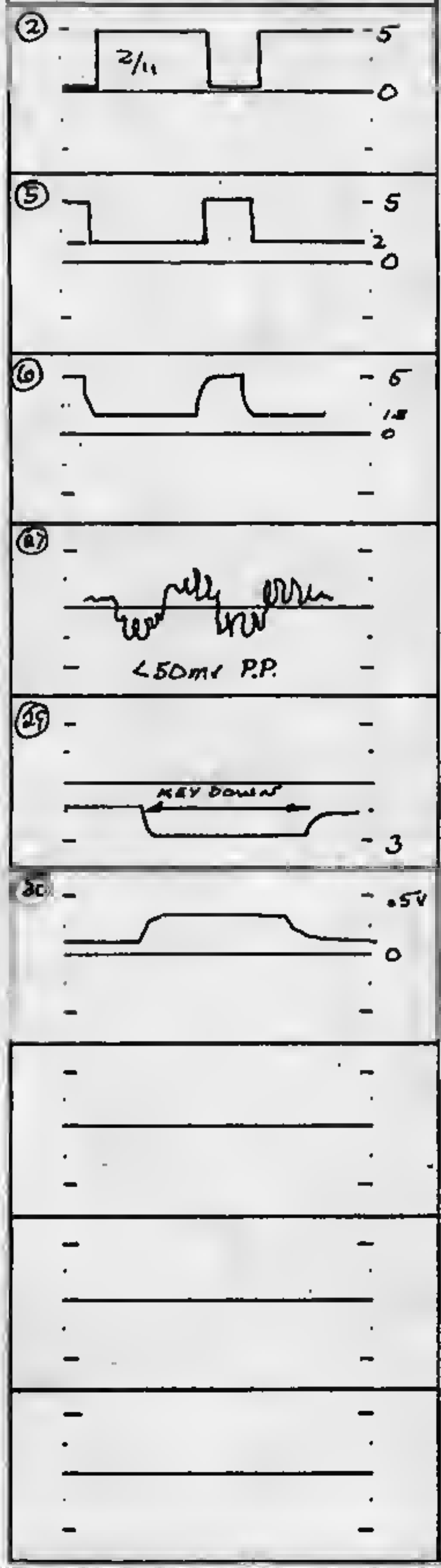



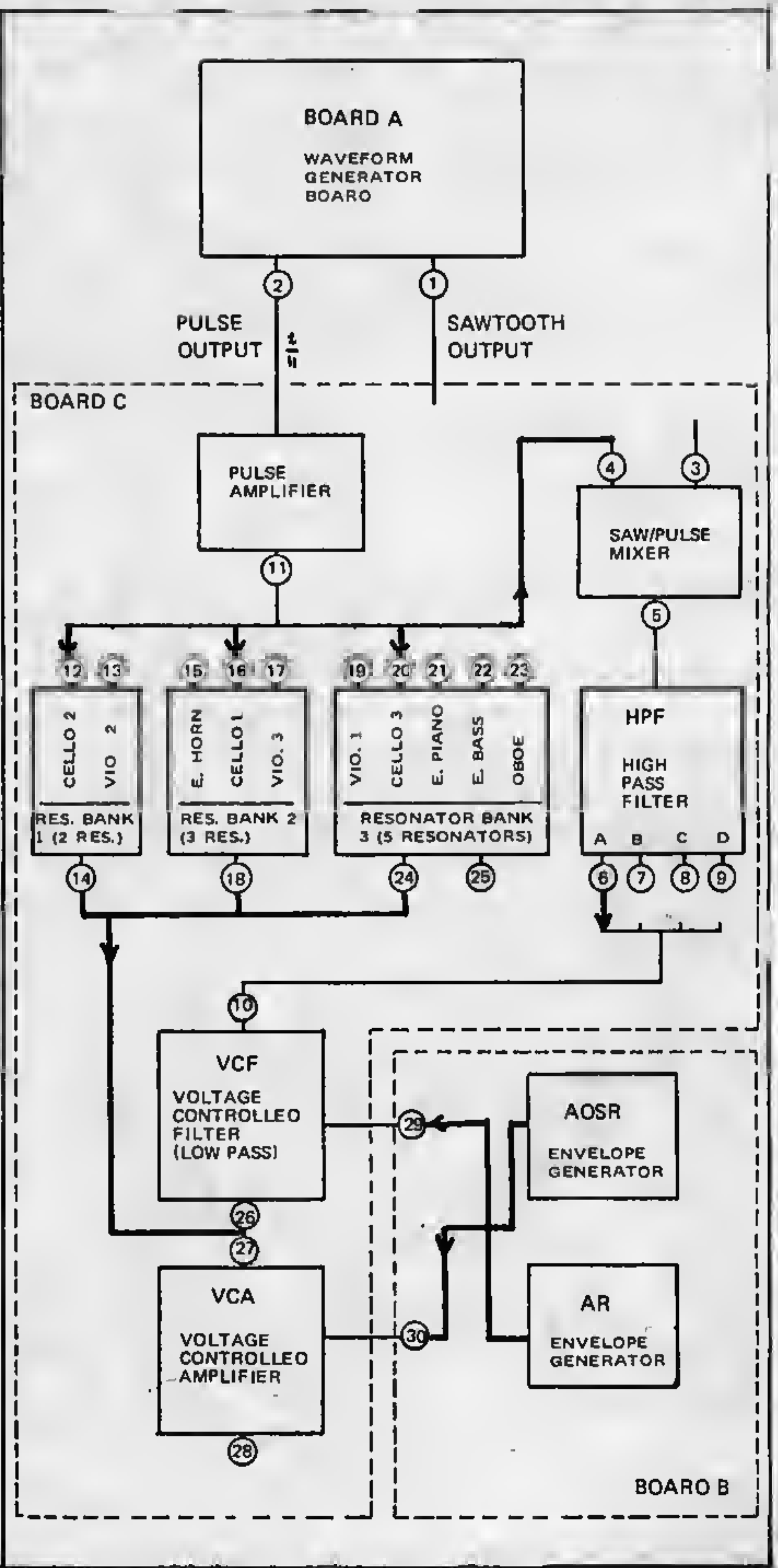
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 1 | 1 | 0 | 1 | 0 |

# 2701 VOICE FLOW CHART

**VOICE: CELLO ⑩**

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



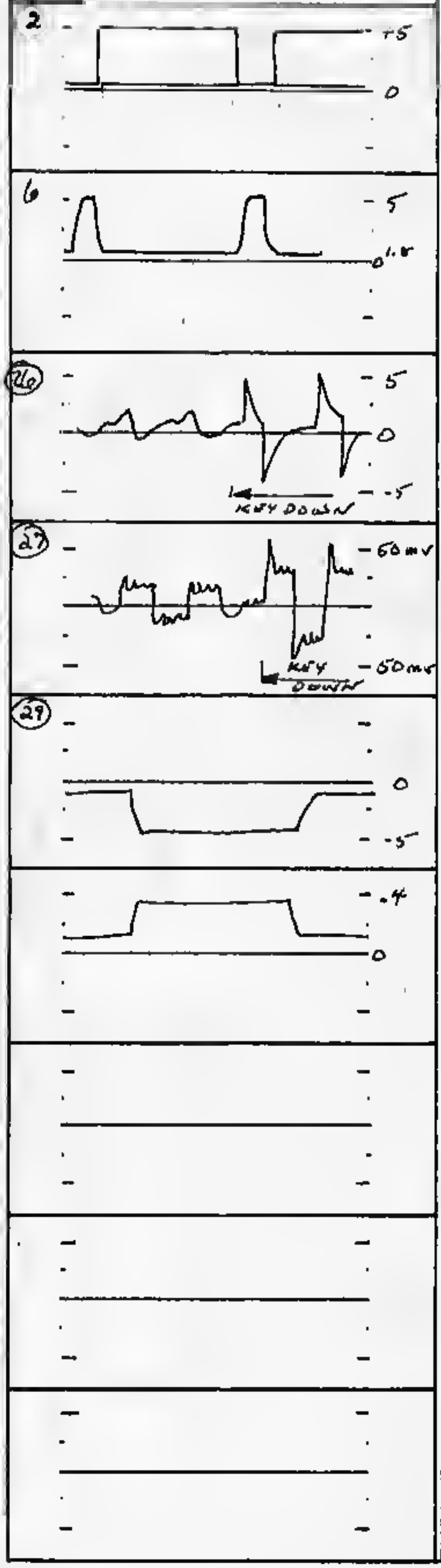



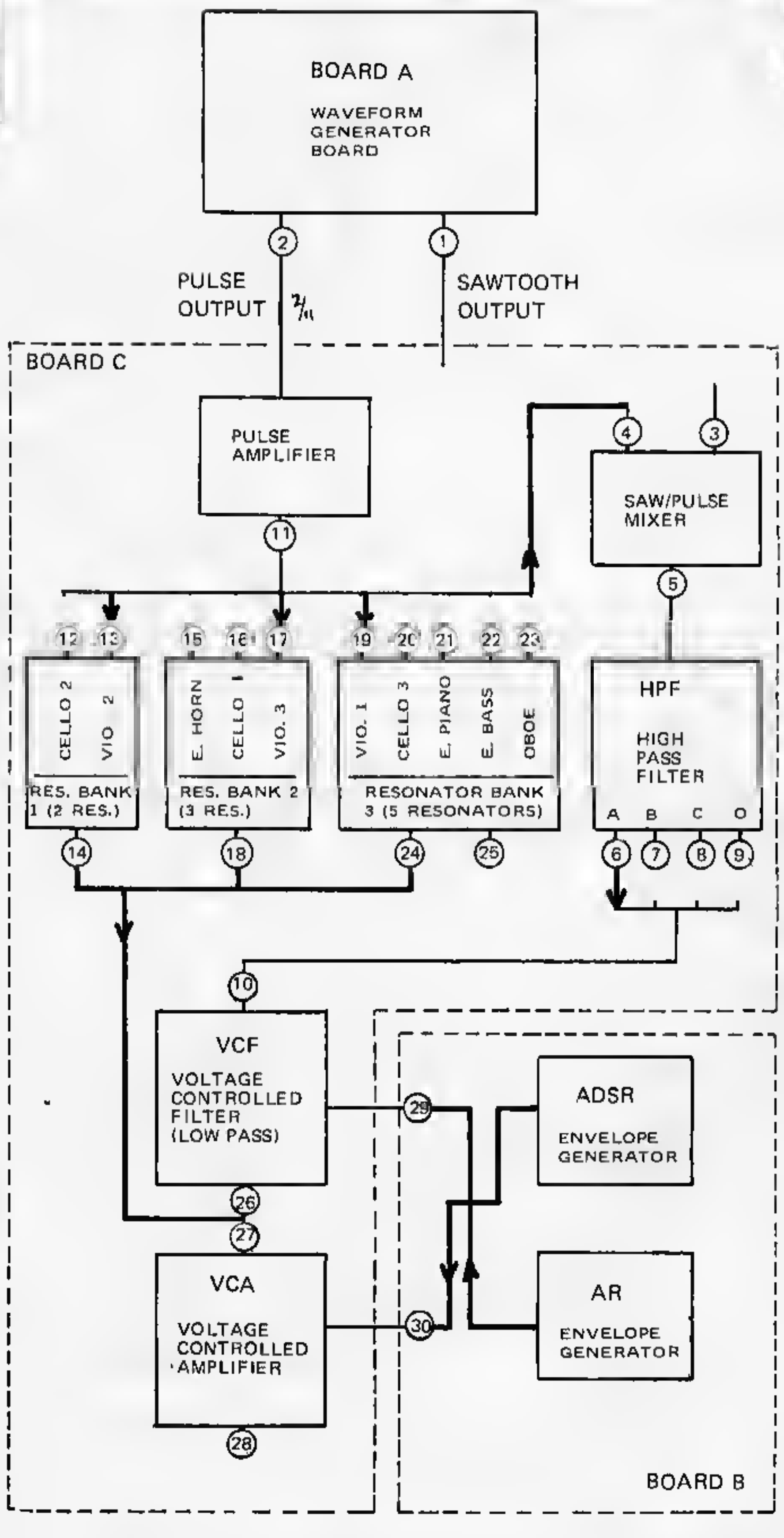
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 1 | 1 | 0 | 1 | 1 |

# 2701 VOICE FLOW CHART

**VOICE: VIOLIN** 11

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



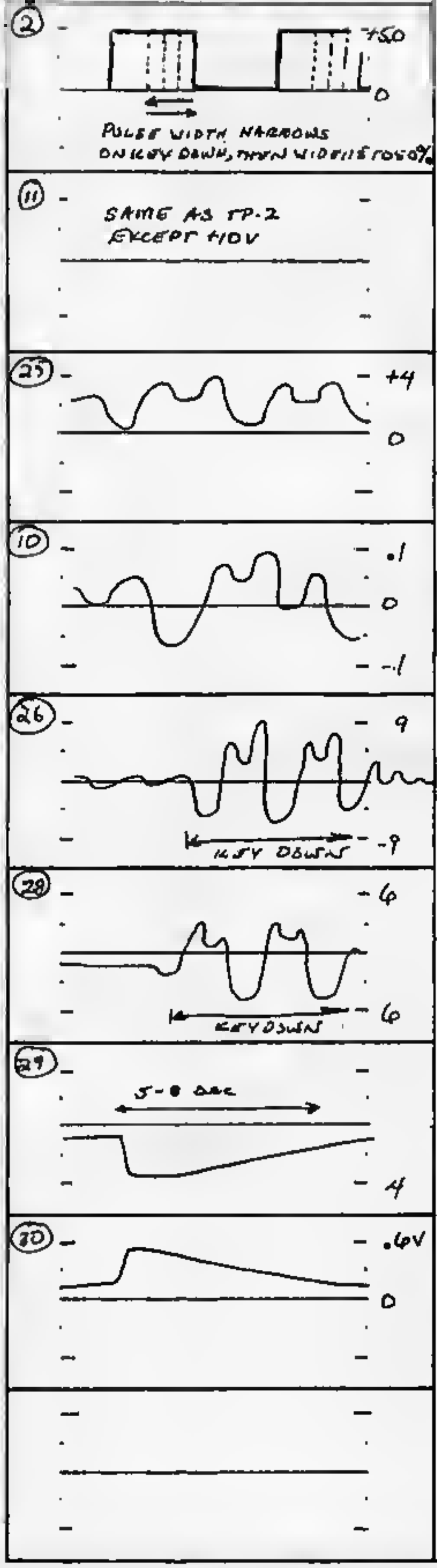
# 2701 VOICE FLOW CHART

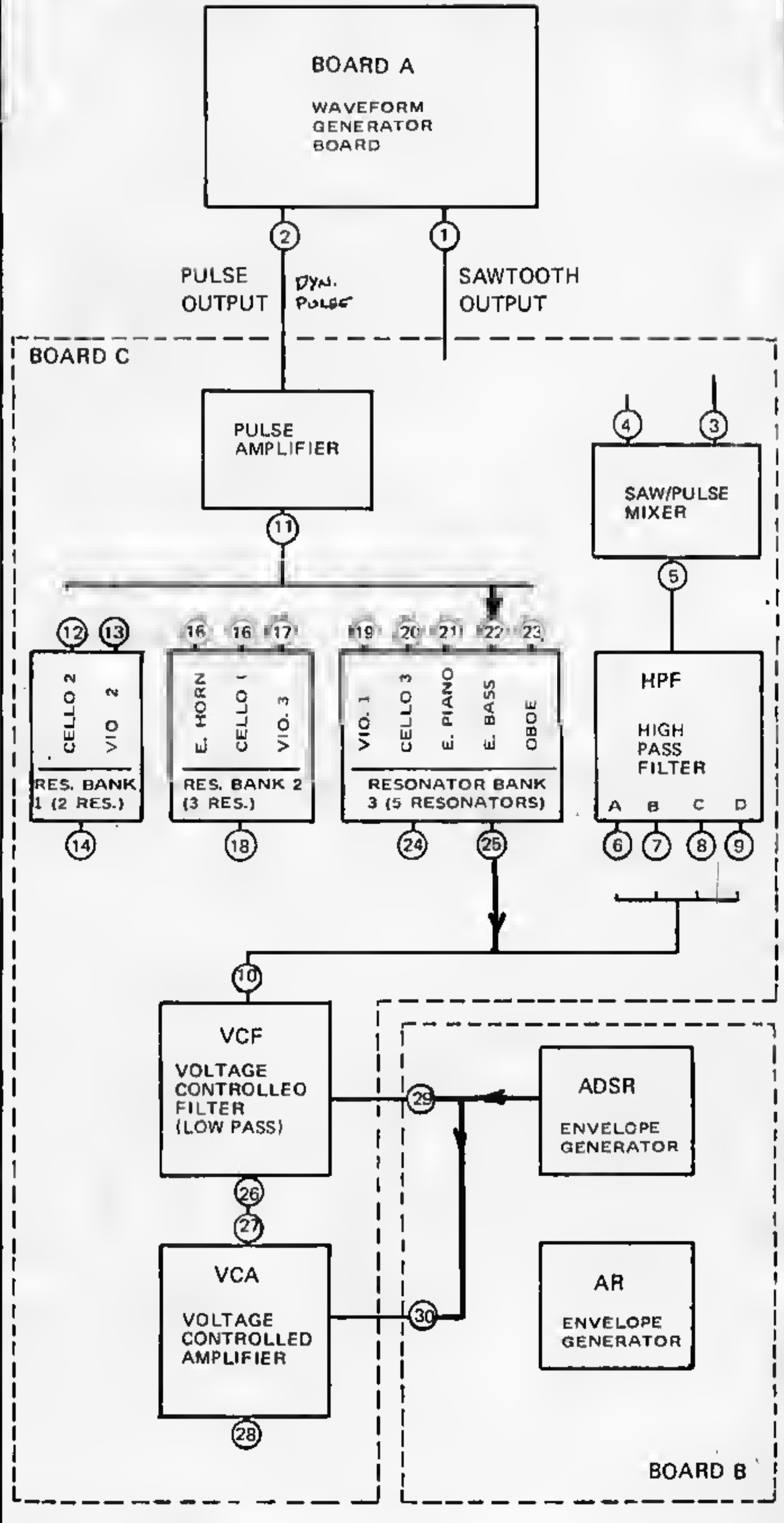
**VOICE: ELEC. BASS**

VOICE CODE

| A | B | C | D | E |
|---|---|---|---|---|
| 1 | 1 | 1 | 0 | 0 |

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



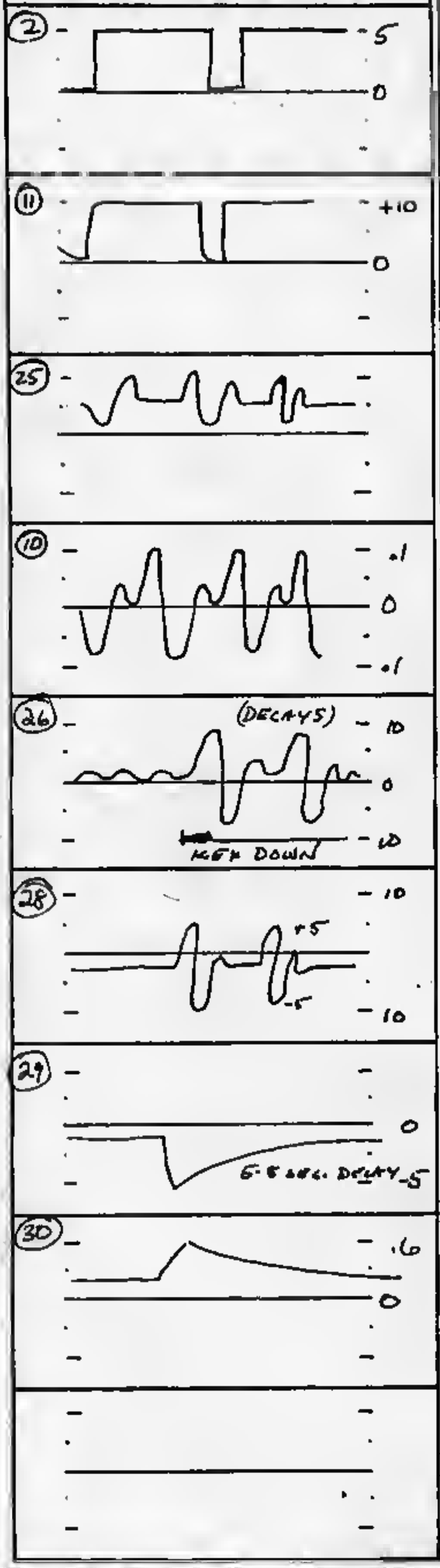



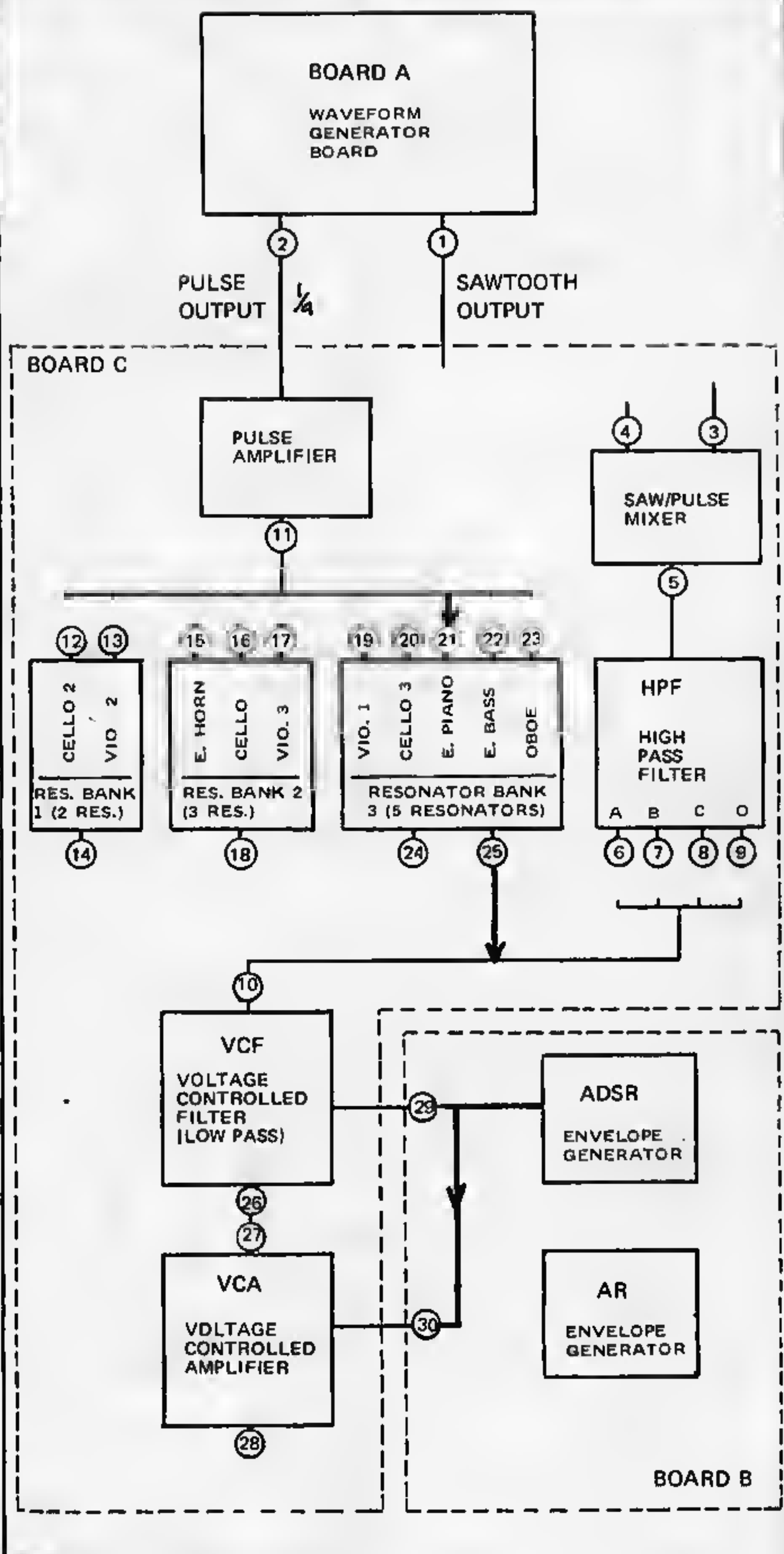
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 1 | 1 | 1 | 0 | 1 |

# 2701 VOICE FLOW CHART

VOICE:ELEC. PIANO

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.

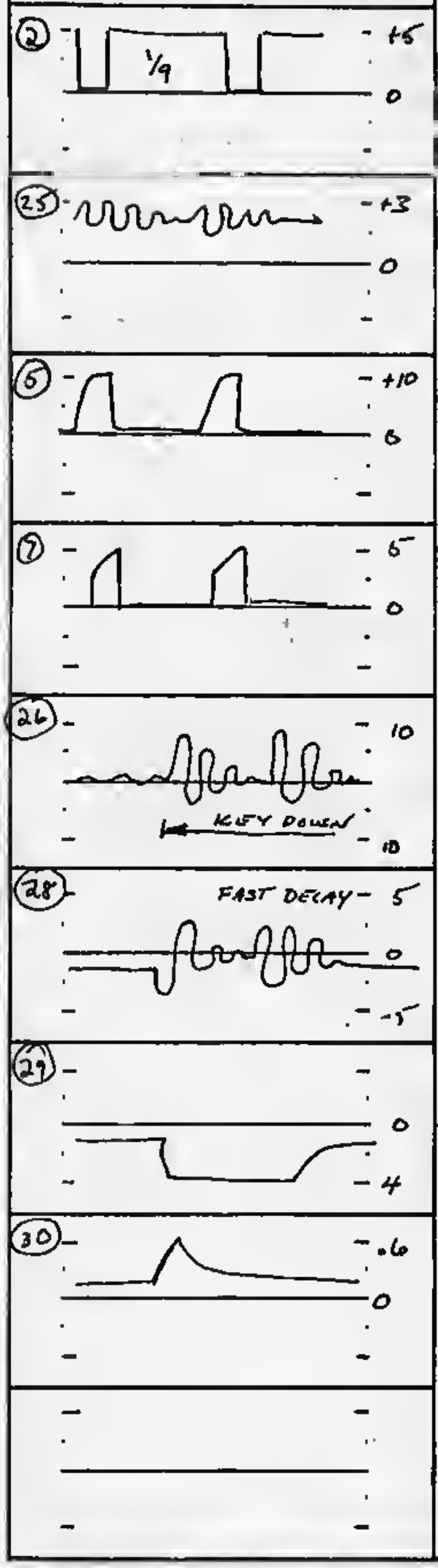


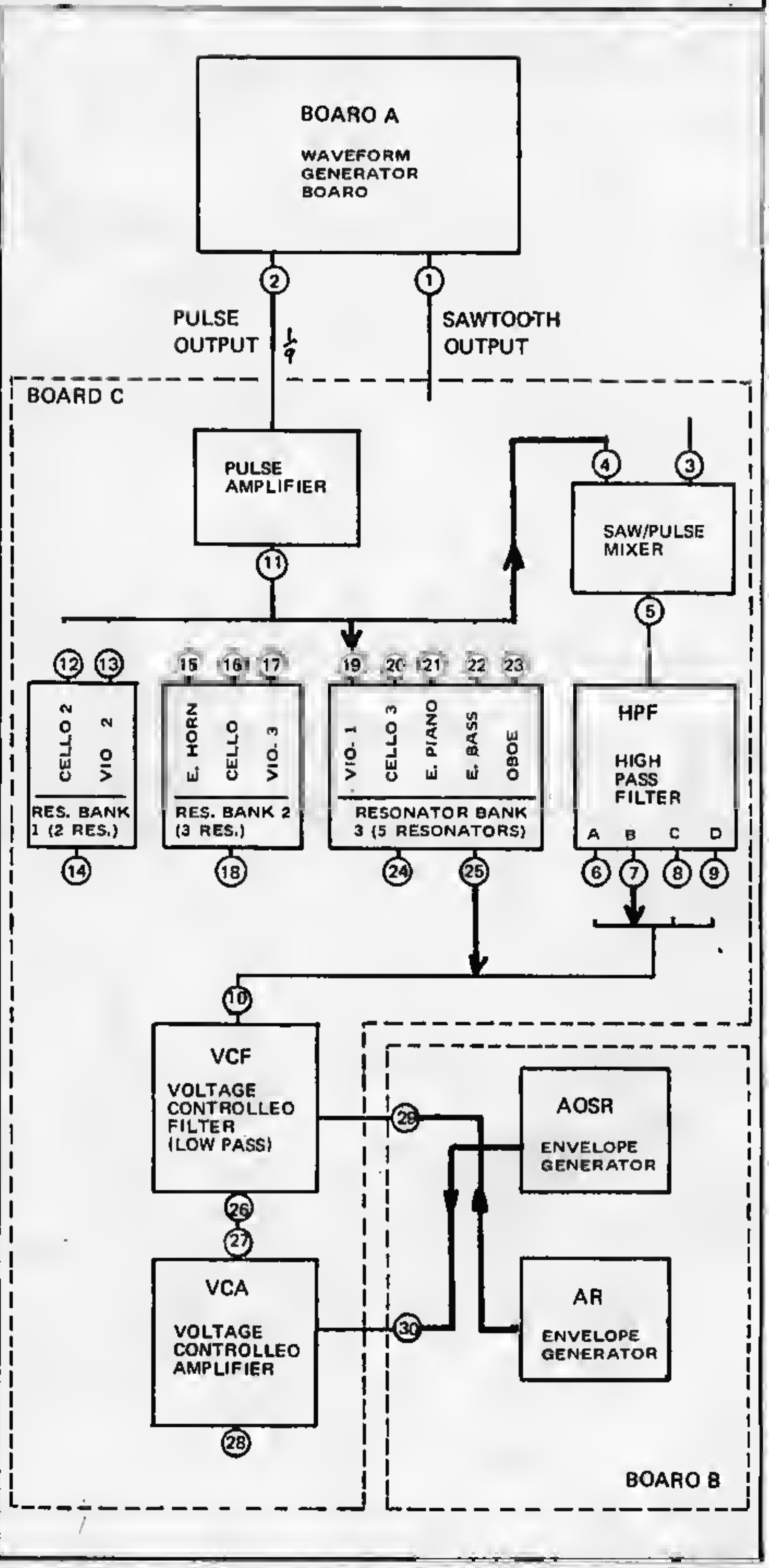



| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 1 | 1 | 1 | 1 | 0 |

**2701 VOICE FLOW CHART** VOICE: BANJO ⑭

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.

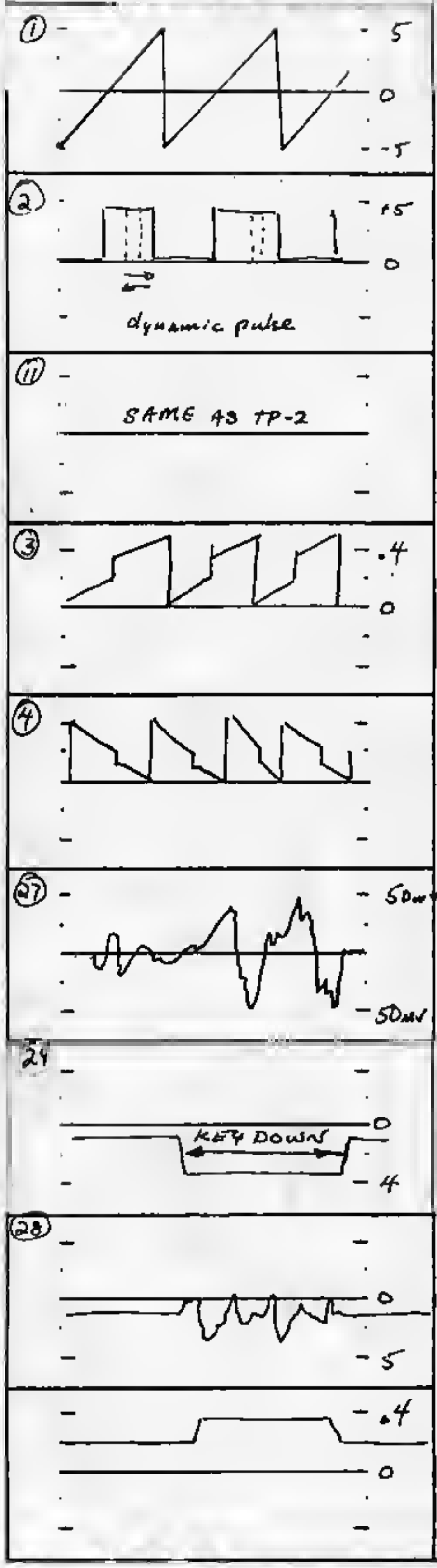


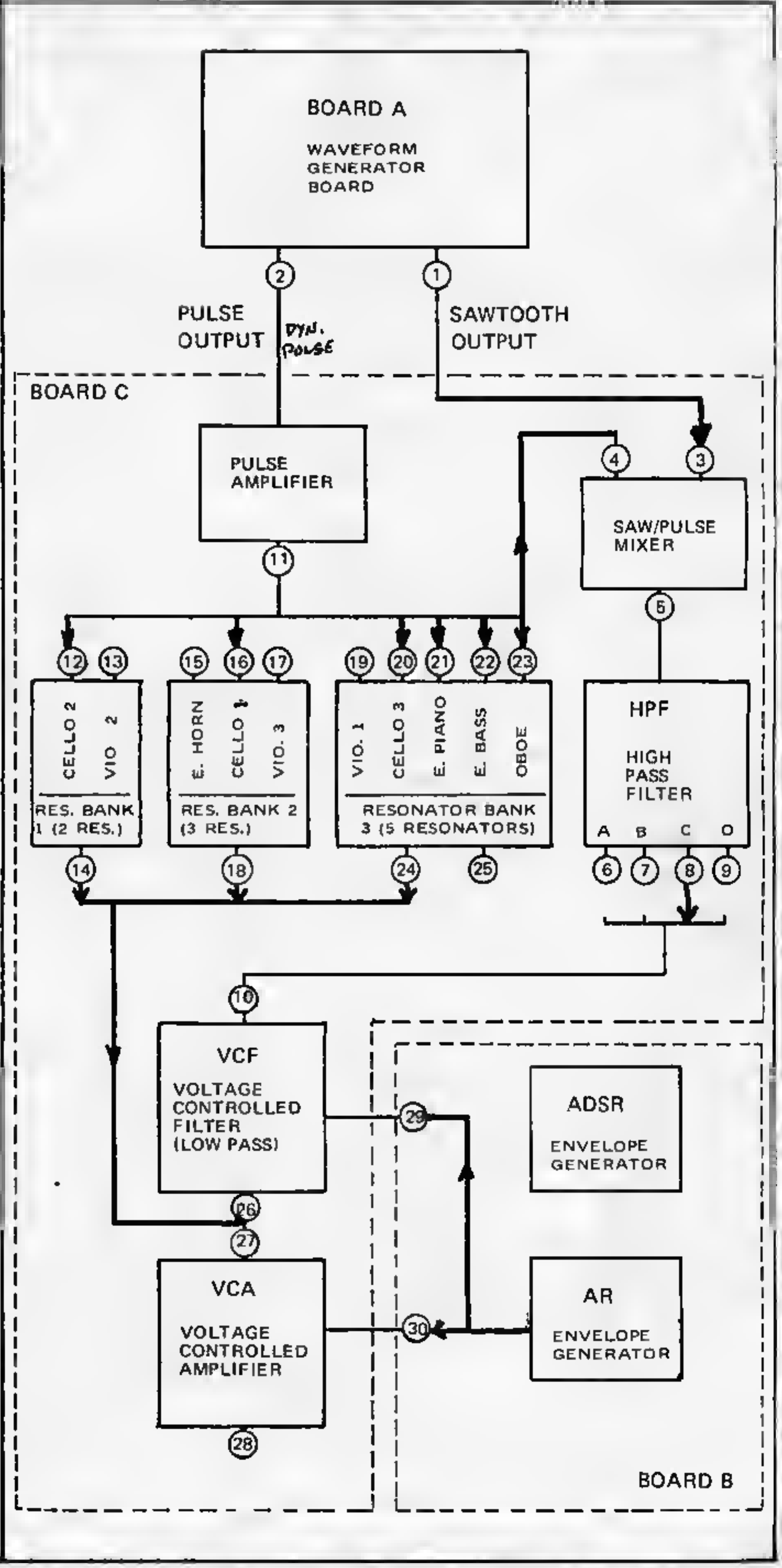



| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 1 | 1 | 1 | 1 | 1 |

**2701 VOICE FLOW CHART** VOICE: FUZZ GUIT. I

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



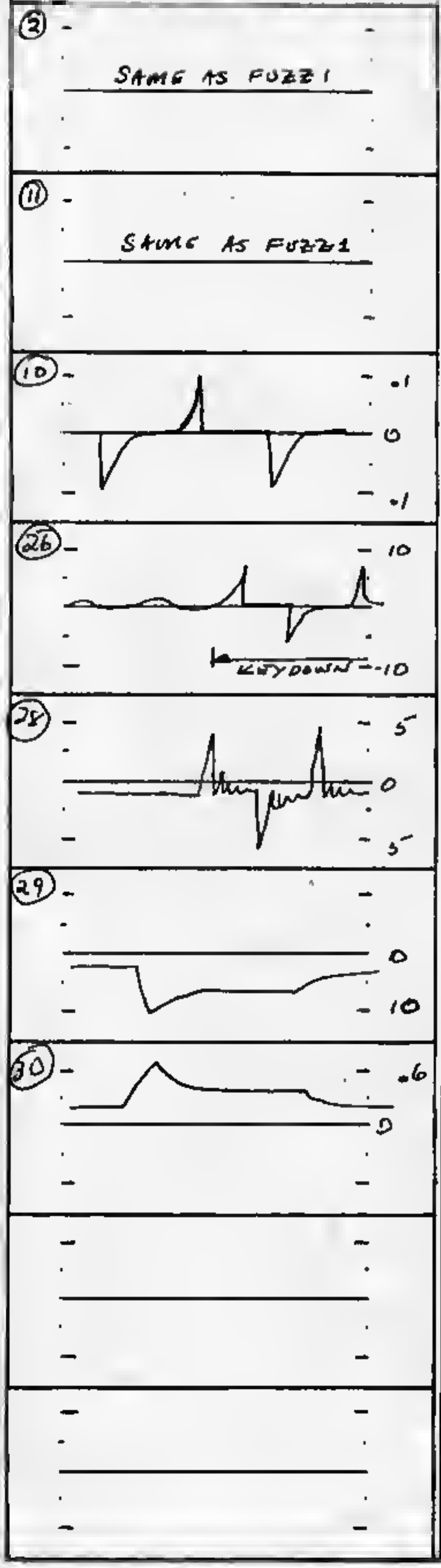
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 0 | 1 | 1 | 1 | 1 |

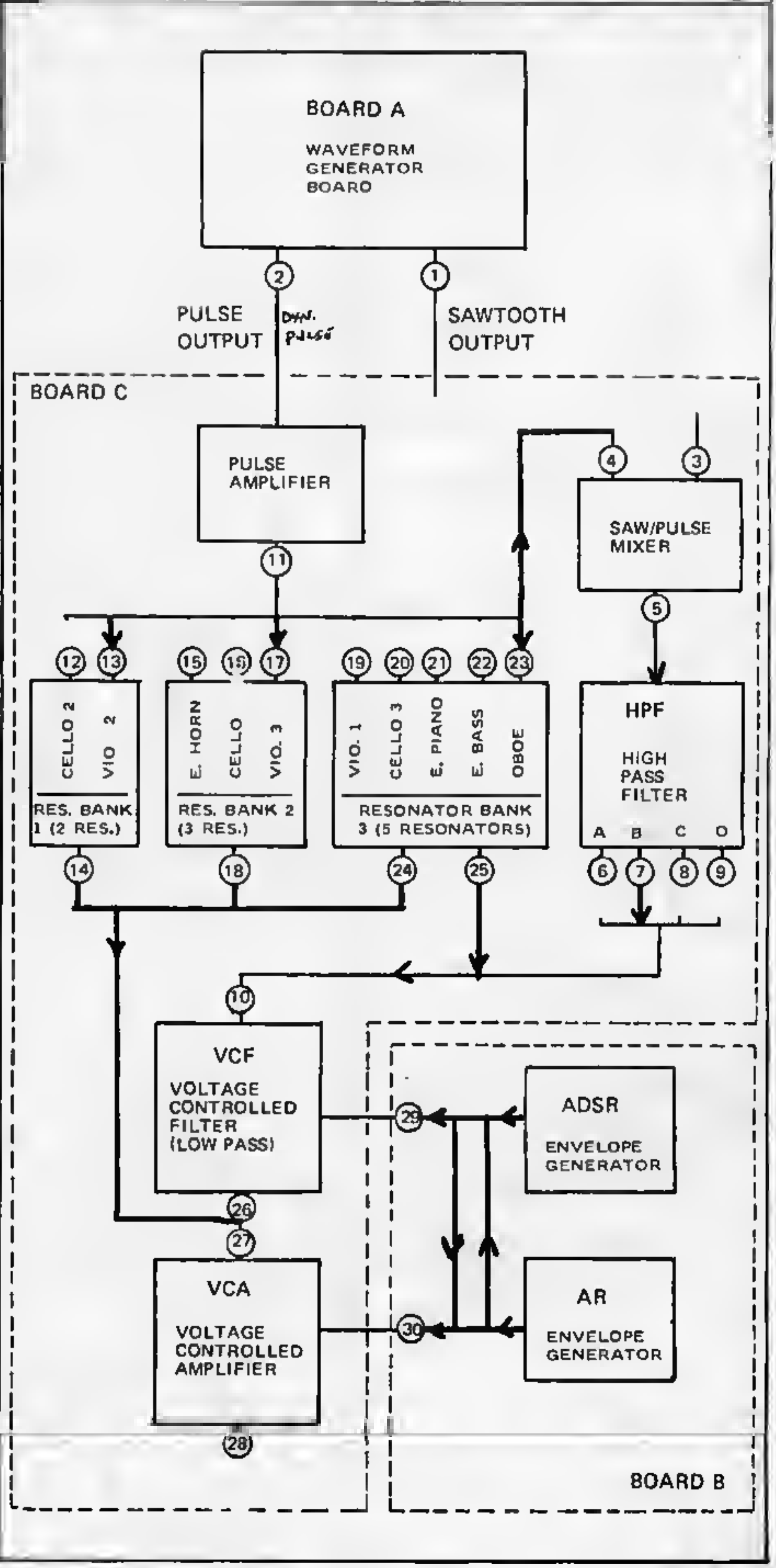
## 2701 VOICE FLOW CHART

**VOICE: FUZZ GUIT. II**



2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



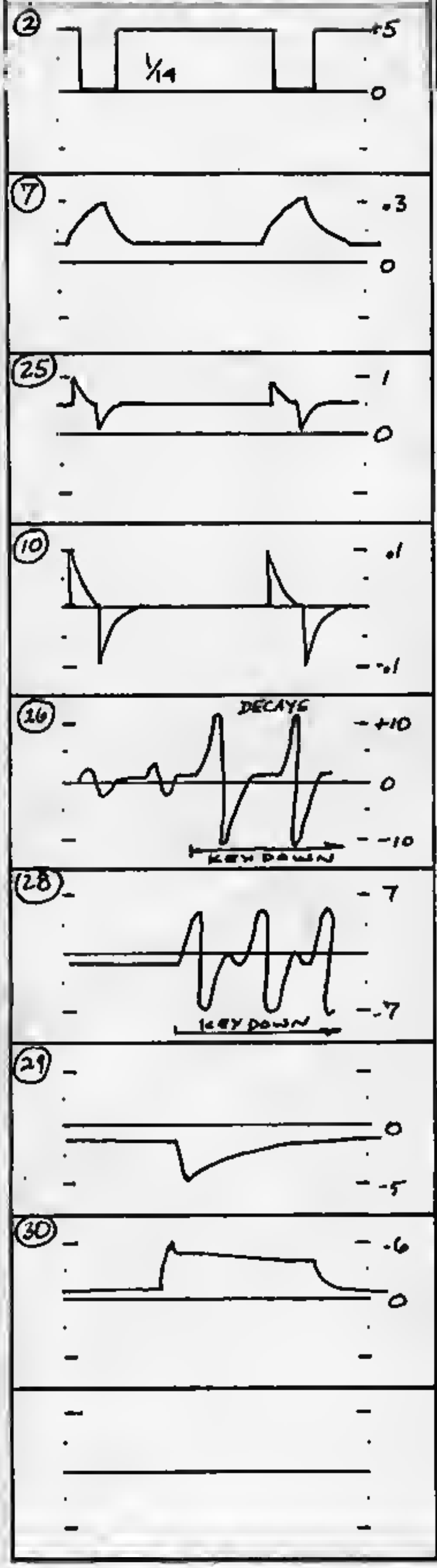



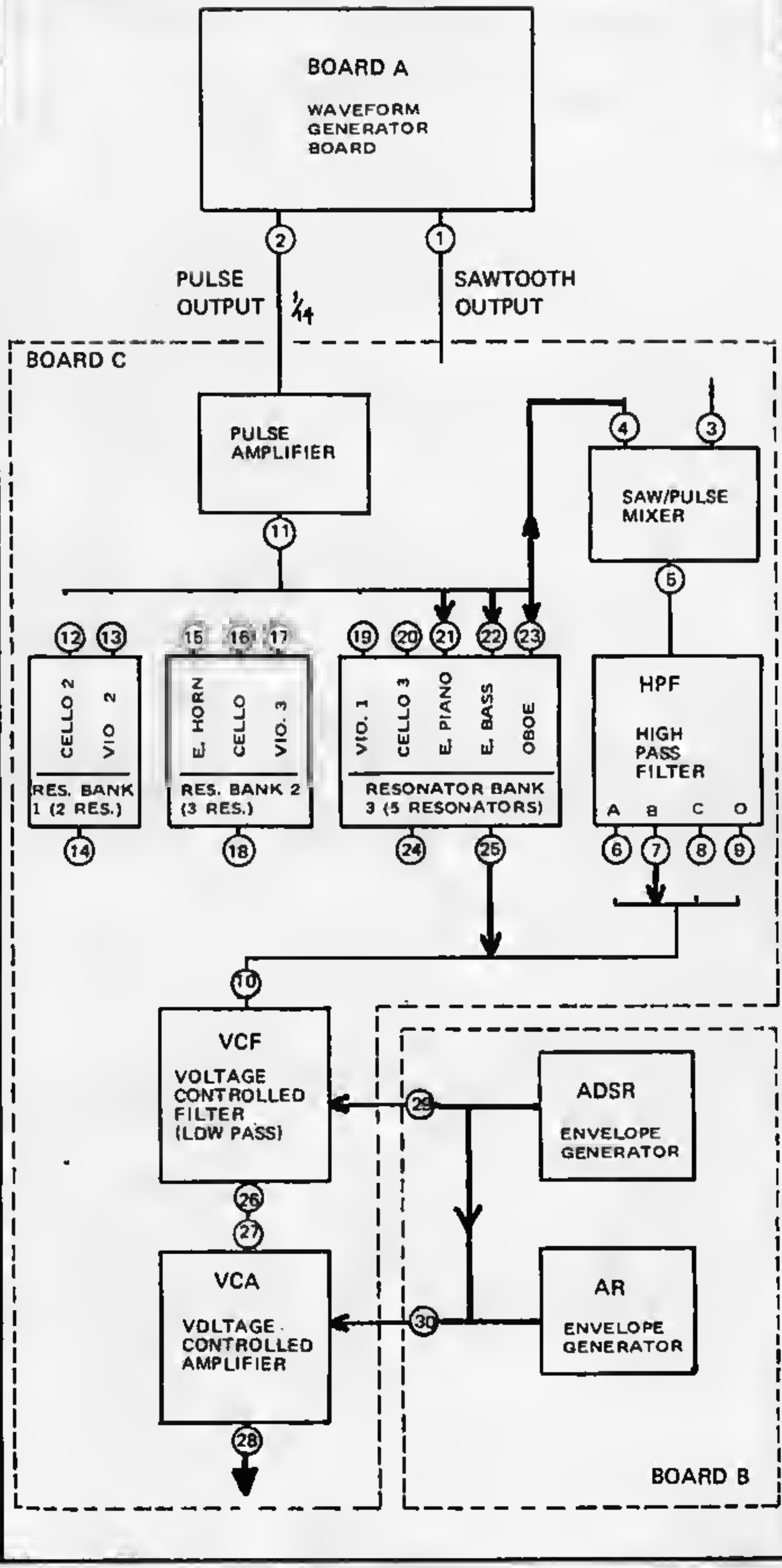
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 0 | 1 | 1 | 1 | 0 |

# 2701 VOICE FLOW CHART

**VOICE: Country Guitar**

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



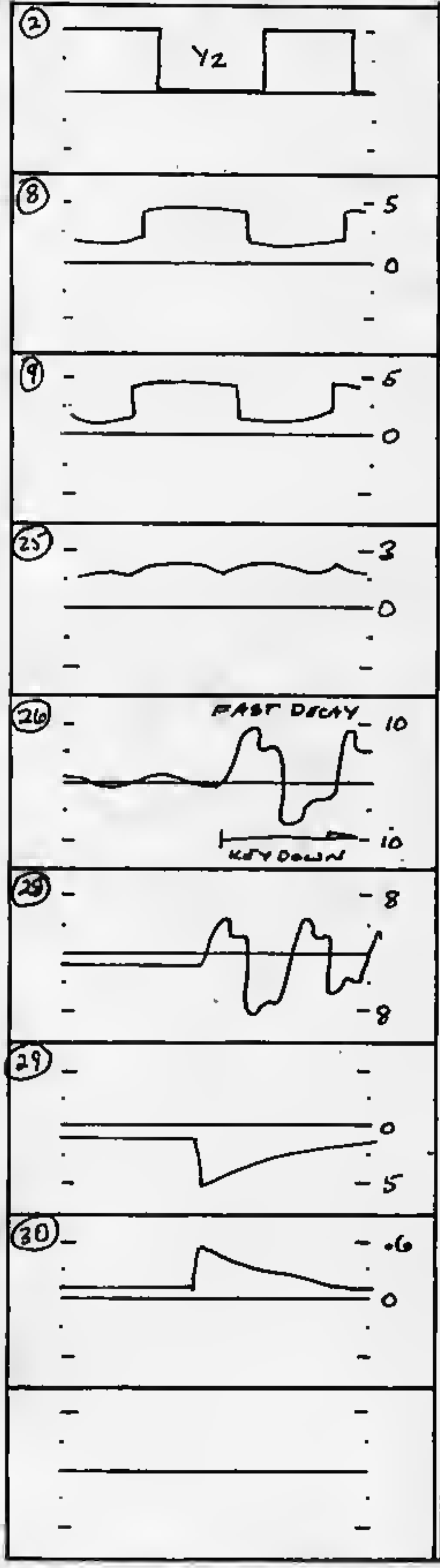



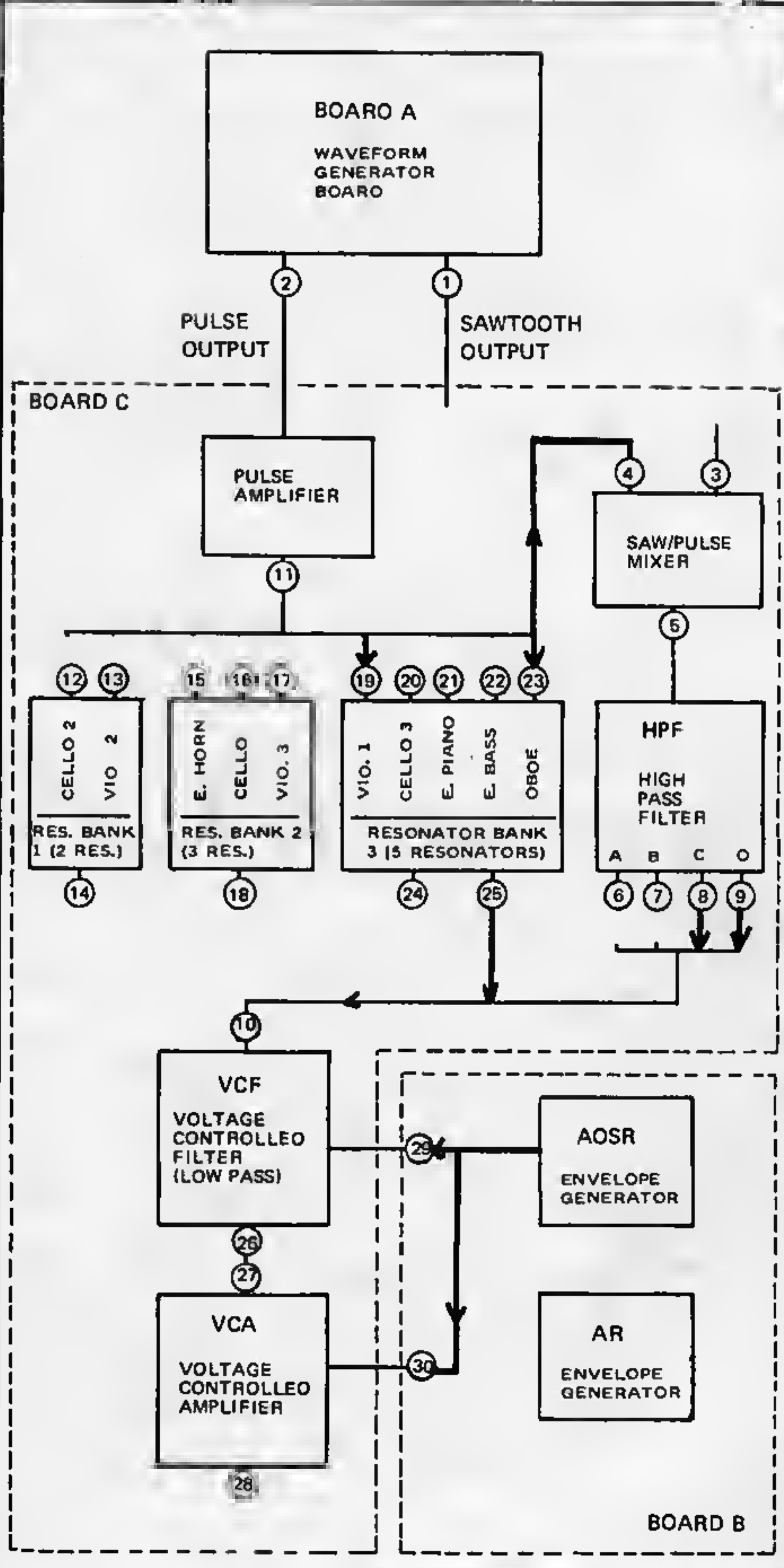
| | A | B | C | D | E |
|---|---|---|---|---|---|
| VOICE CODE | 0 | 1 | 1 | 0 | 1 |

## 2701 VOICE FLOW CHART

**VOICE: STEEL DRUM**

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



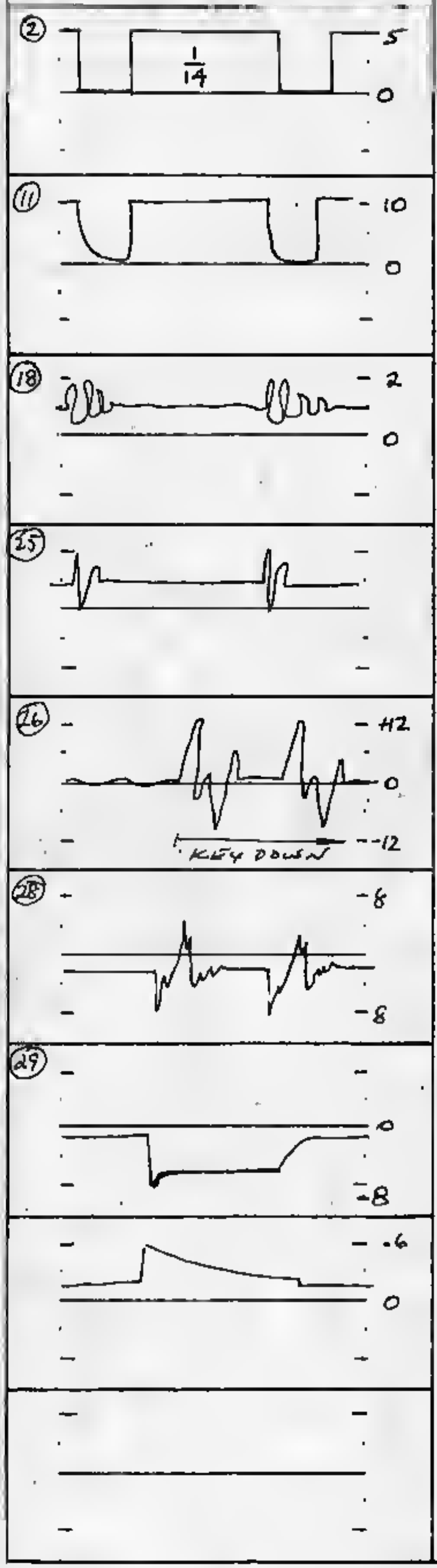



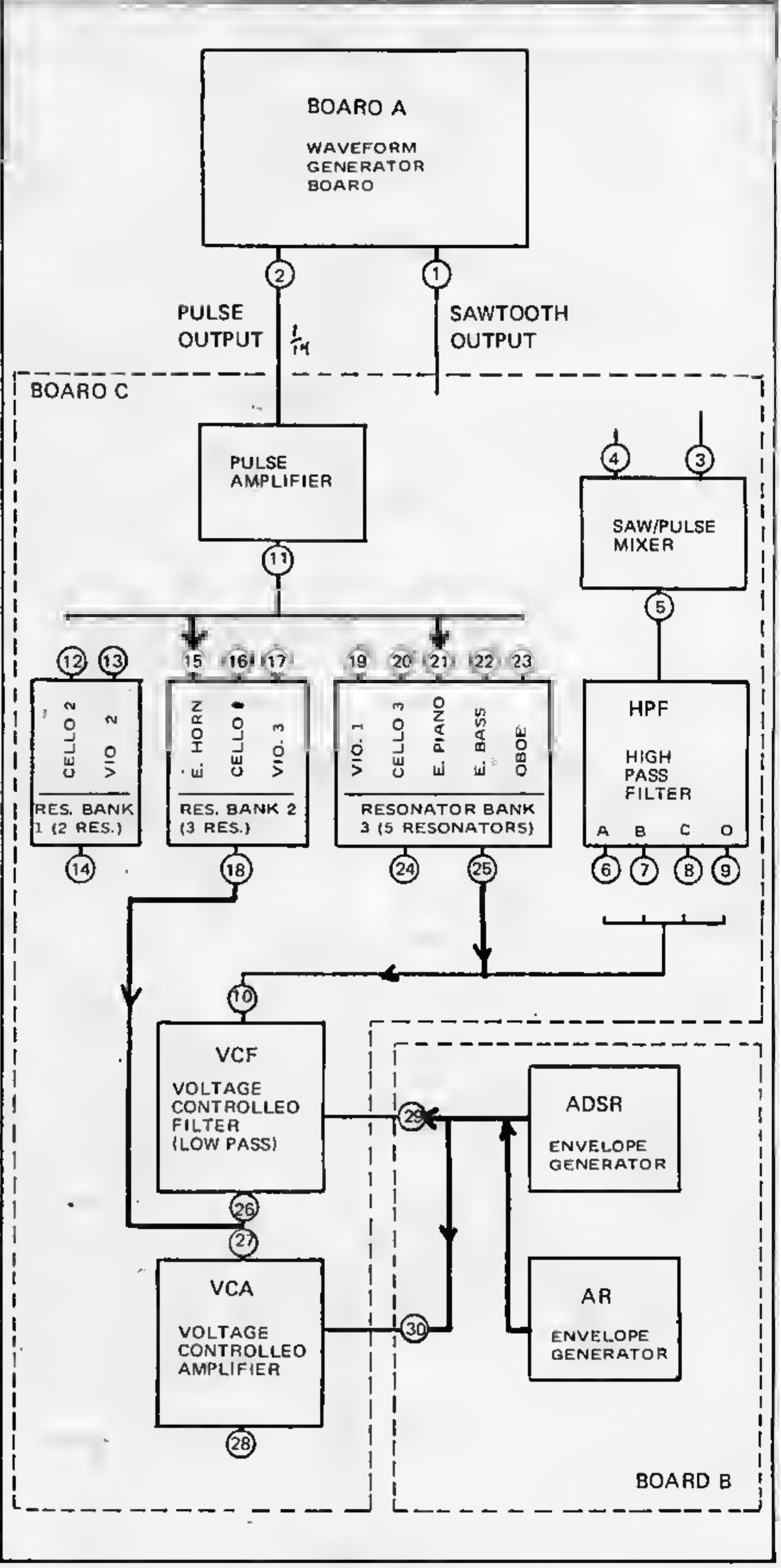
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 0 | 1 | 1 | 0 | 0 |

# 2701 VOICE FLOW CHART

**VOICE:SPACE BASS**

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.

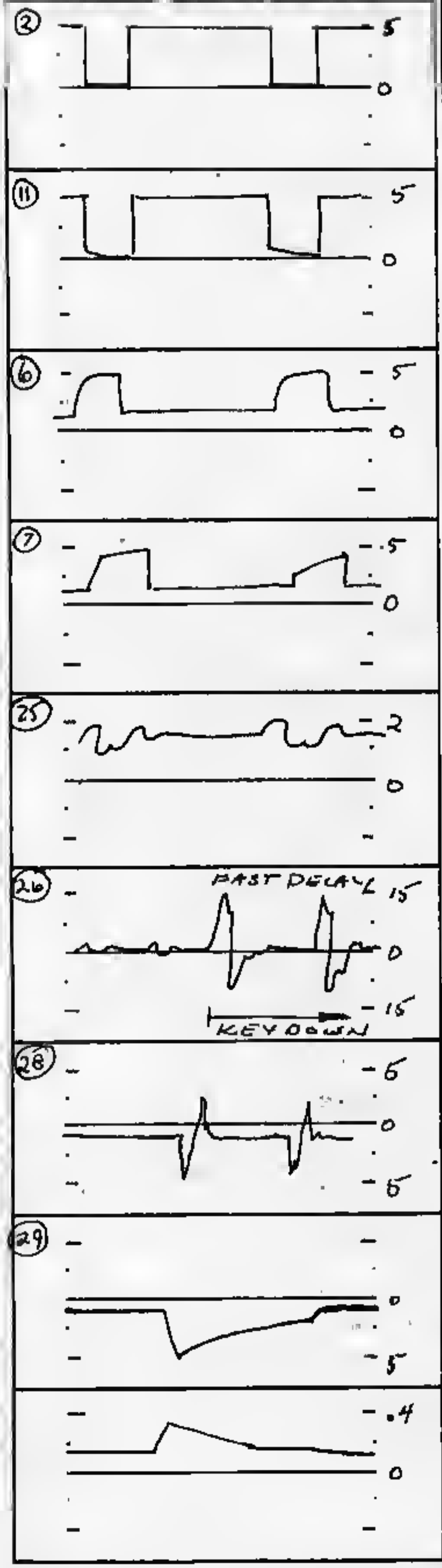


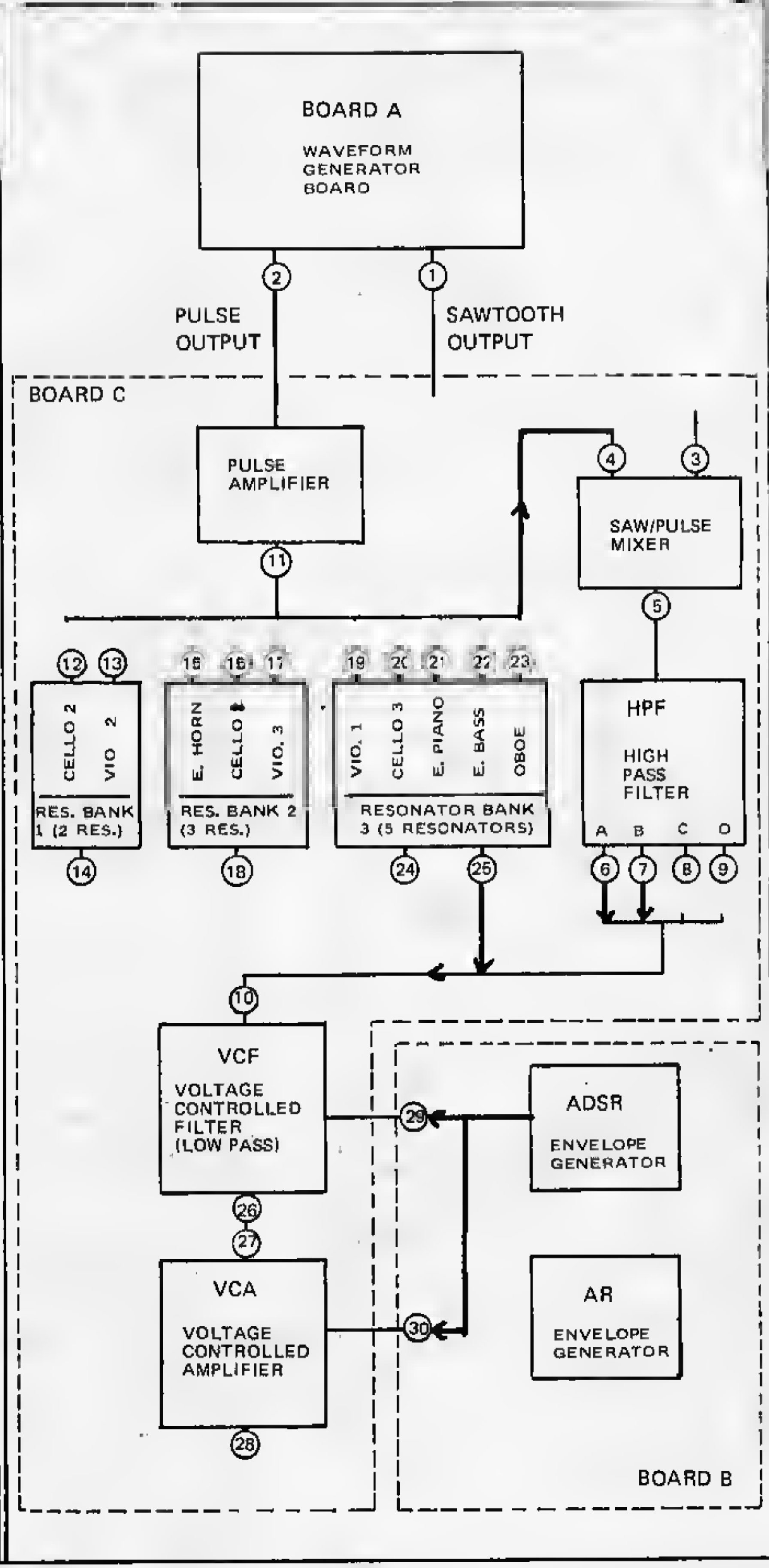



| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 0 | 1 | 0 | 1 | 1 |

# 2701 VOICE FLOW CHART    VOICE: HARPSICHORD

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



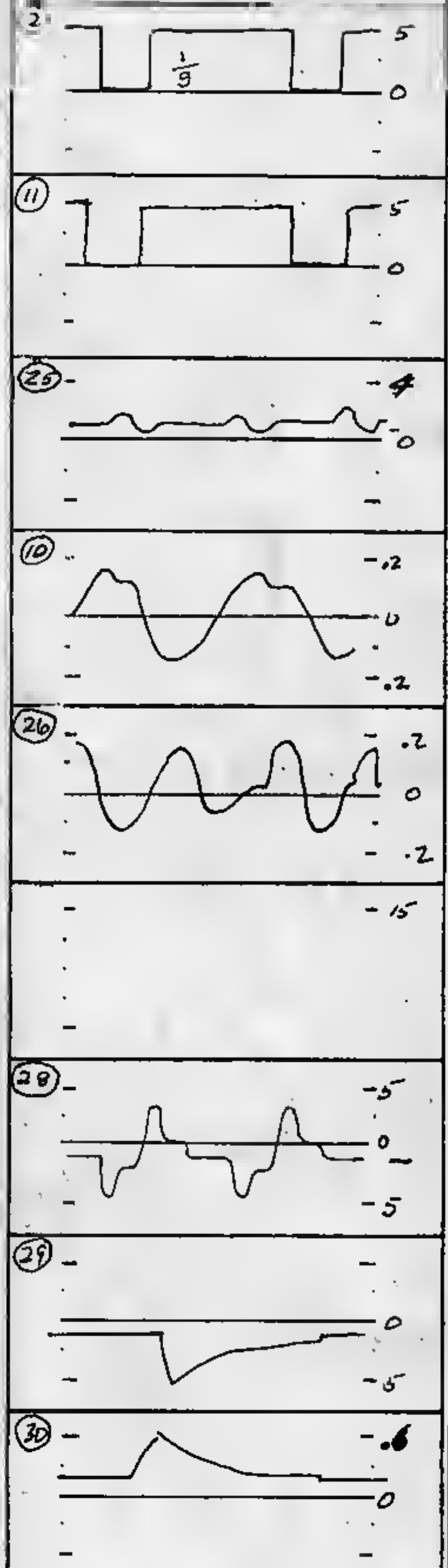



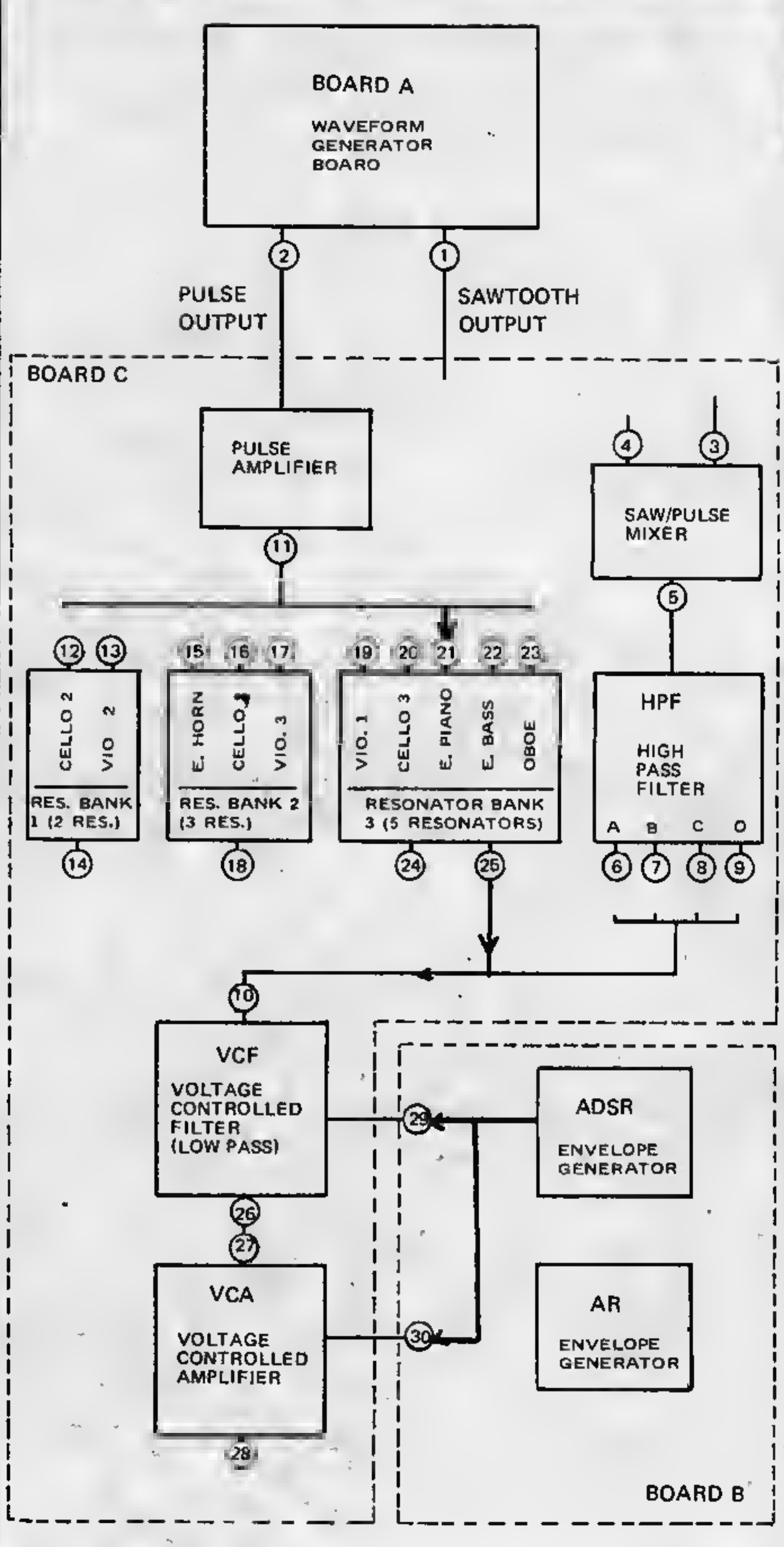
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 0 | 1 | 0 | 1 | 0 |

# 2701 VOICE FLOW CHART

**VOICE: Steel Guitar**

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



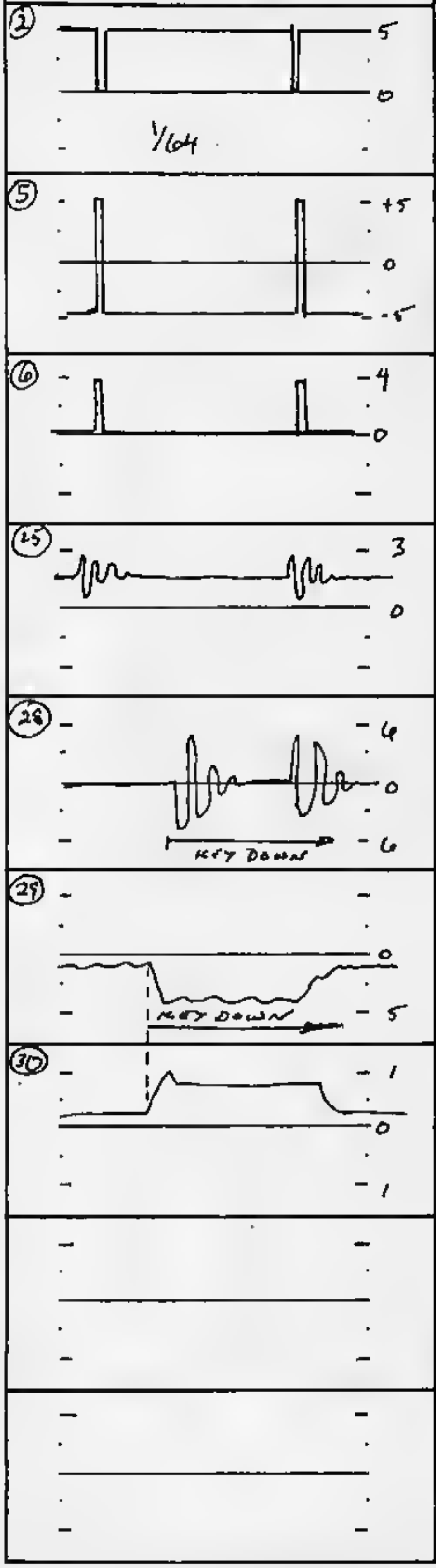



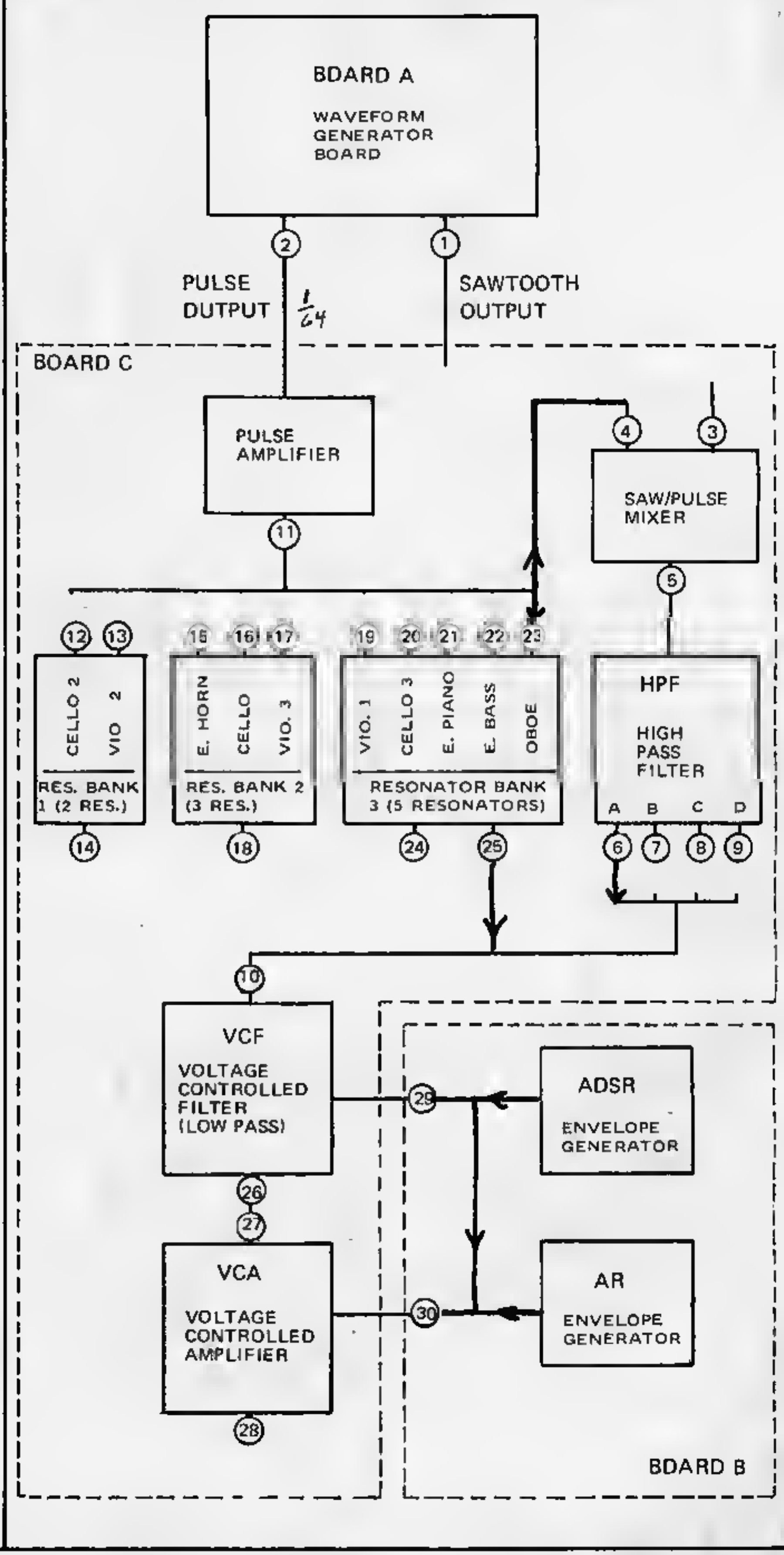
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 0 | 1 | 0 | 0 | 1 |

# 2701 VOICE FLOW CHART

**VOICE: Mute Trumpet**

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



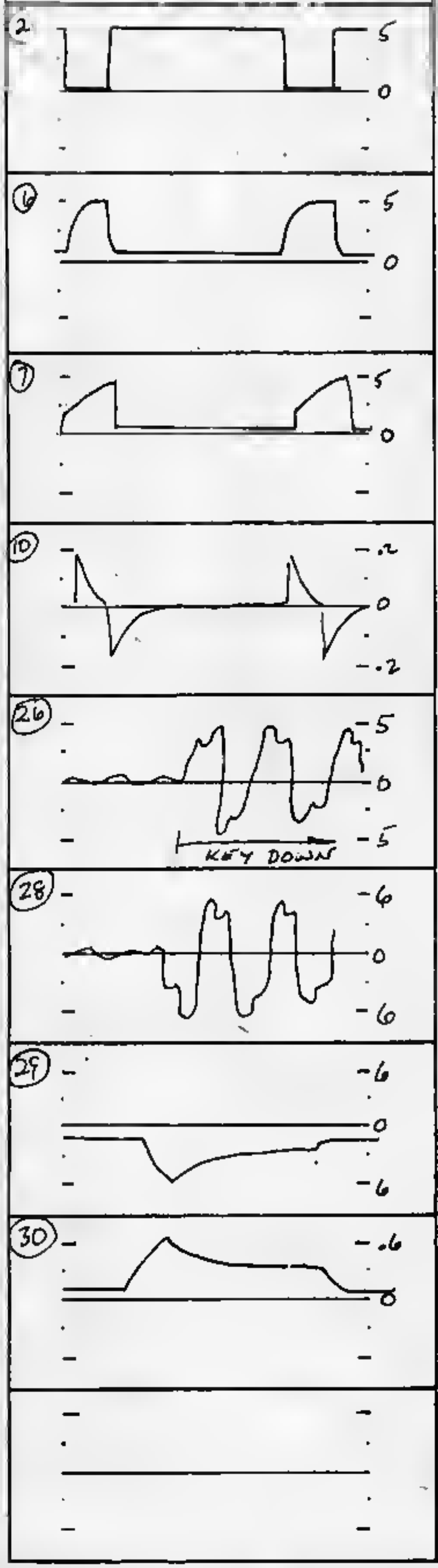
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 0 | 1 | 0 | 0 | 0 |

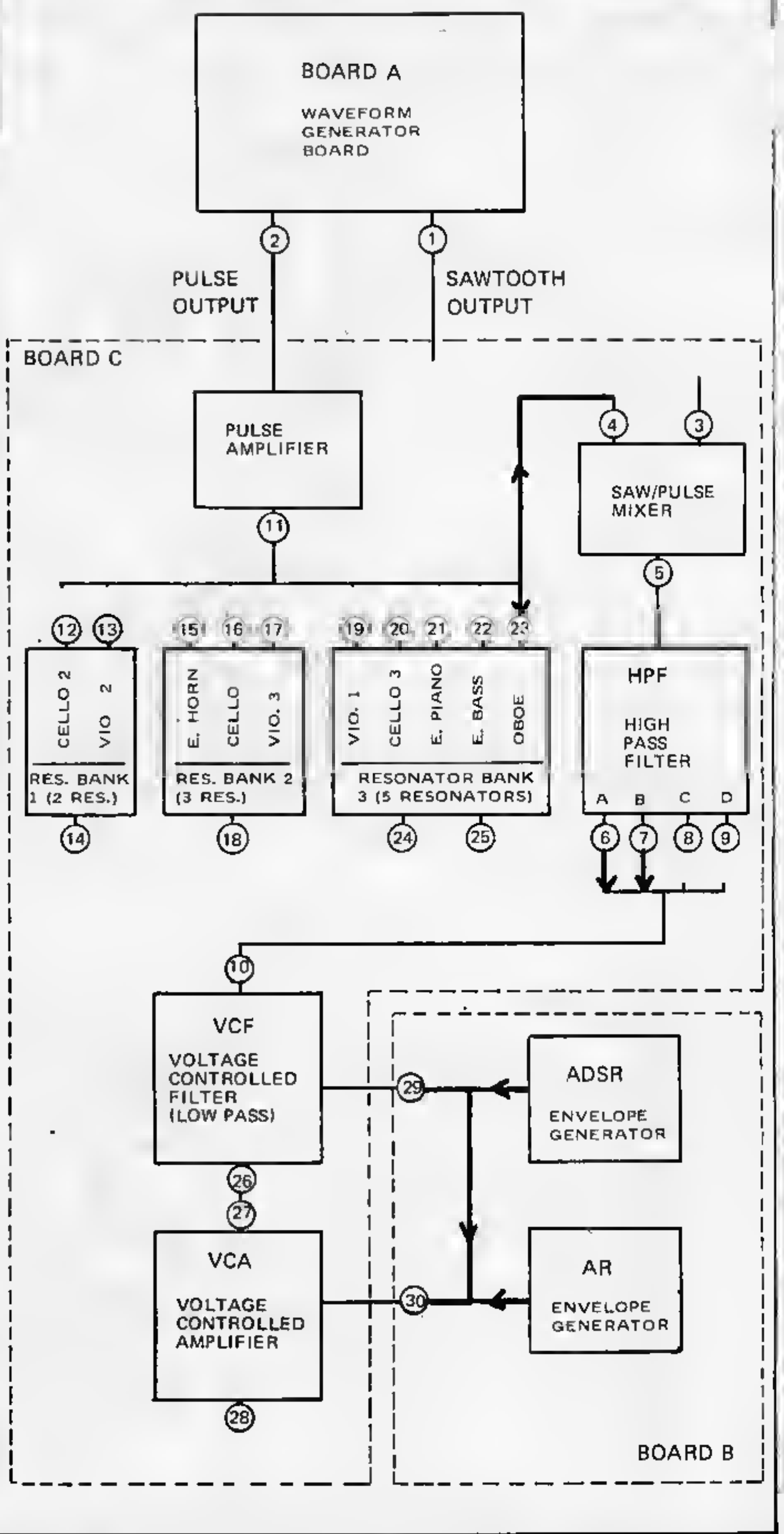
# 2701 VOICE FLOW CHART

## VOICE: COMIC WOW



2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



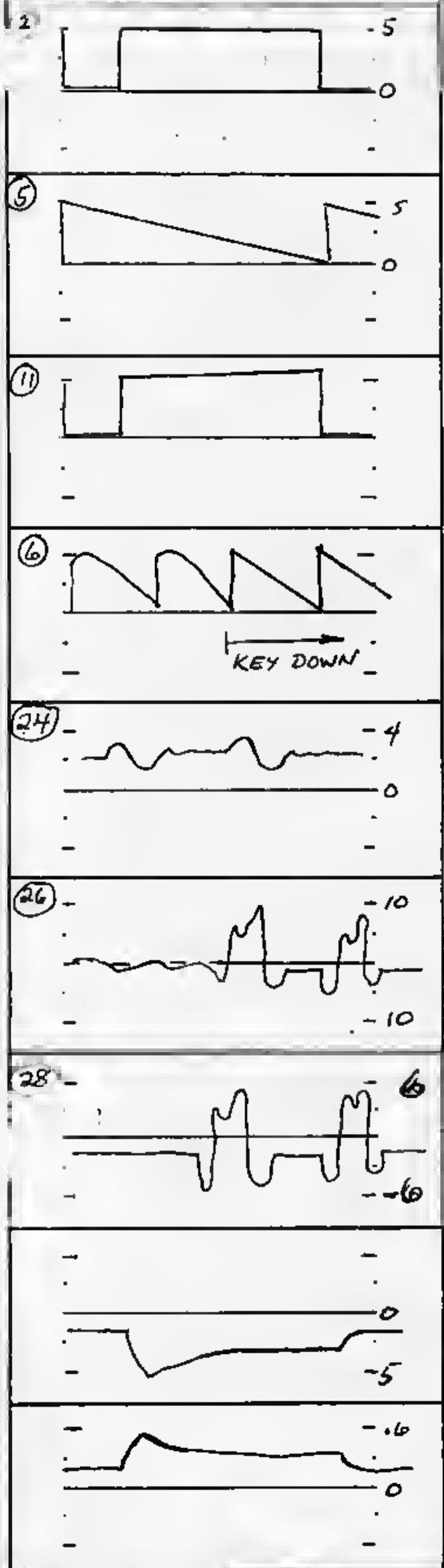
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 0 | 0 | 1 | 1 | 1 |

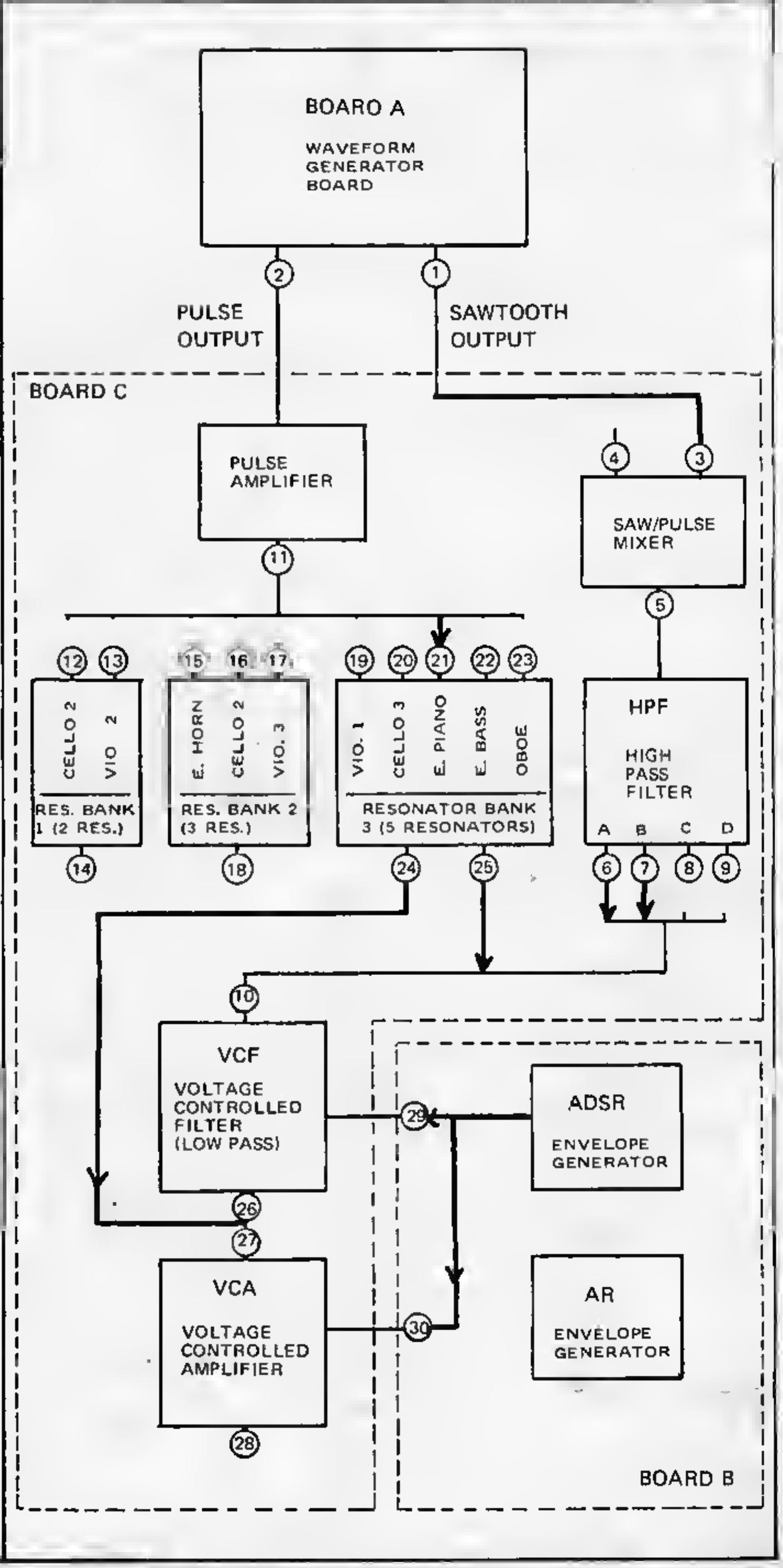
## 2701 VOICE FLOW CHART

**VOICE: PULSAR**

28

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



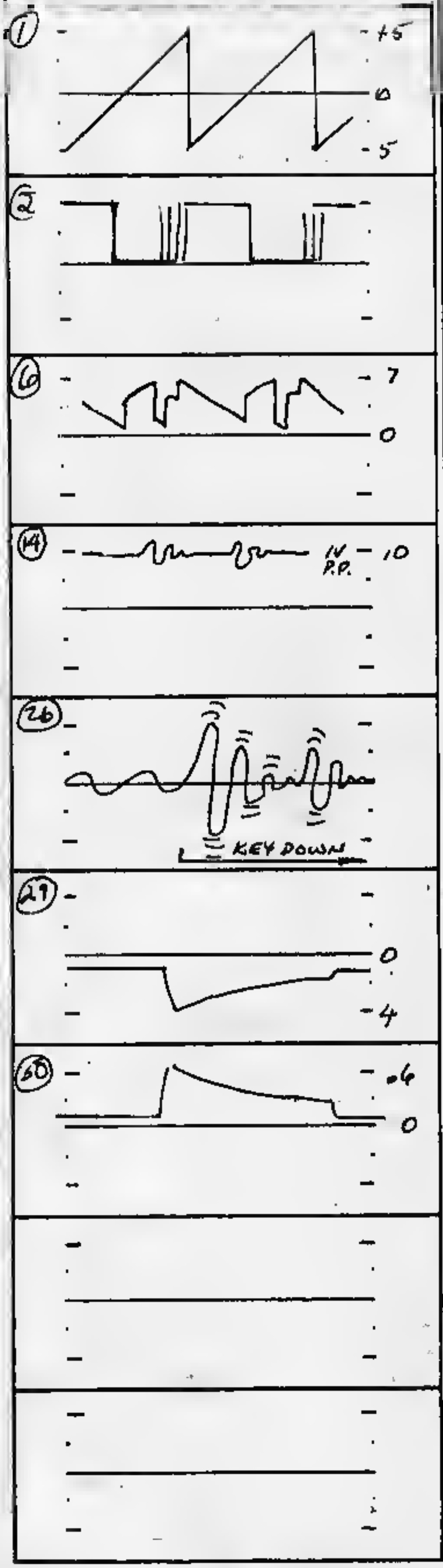



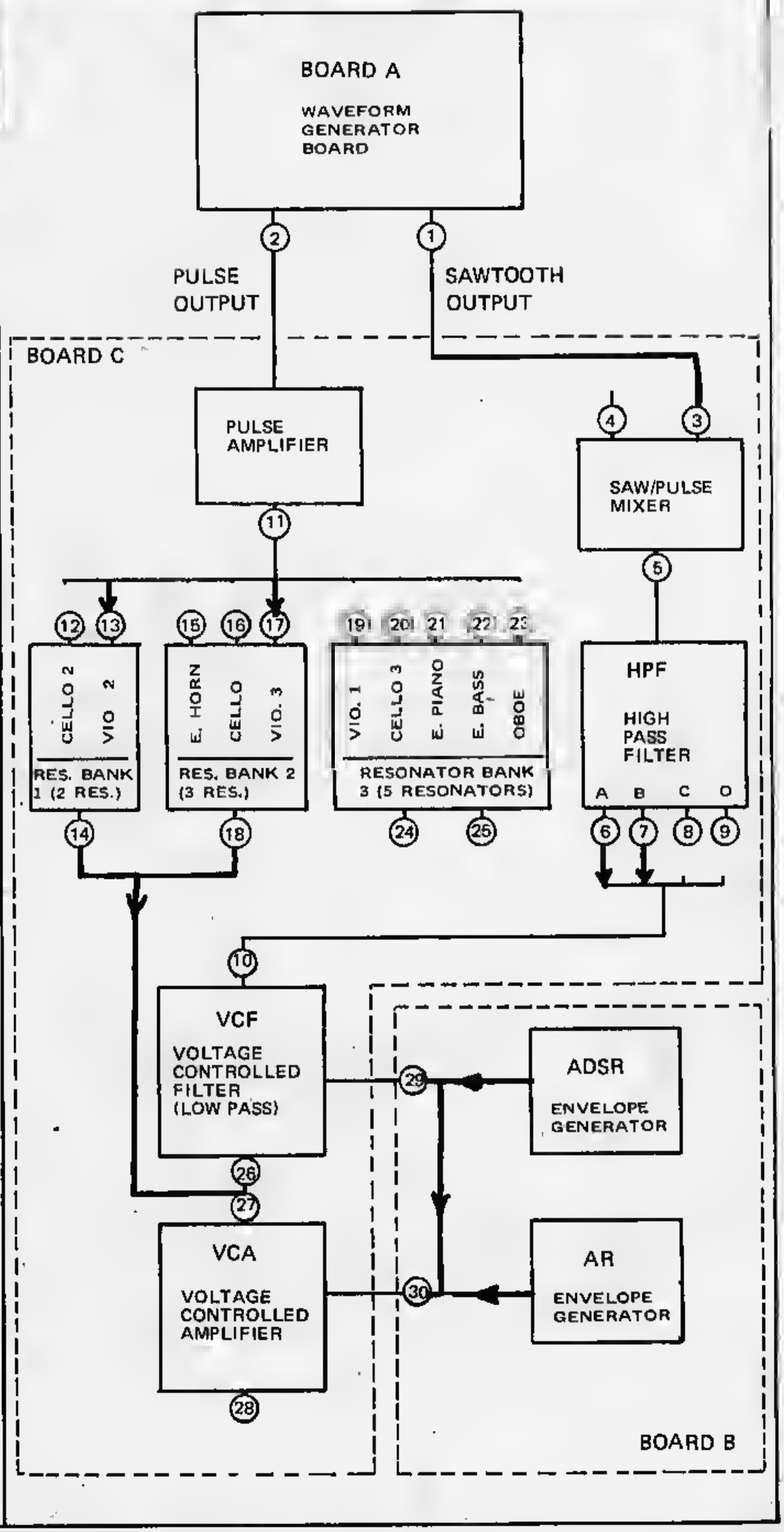
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 0 | 0 | 1 | 1 | 0 |

## 2701 VOICE FLOW CHART

**VOICE: NOZE**

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.

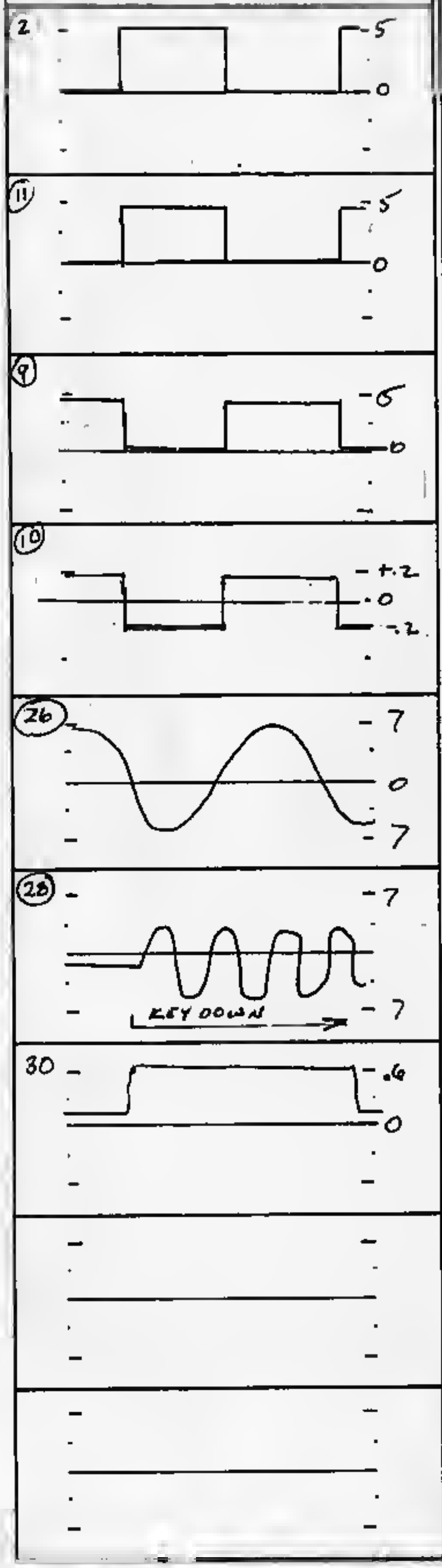


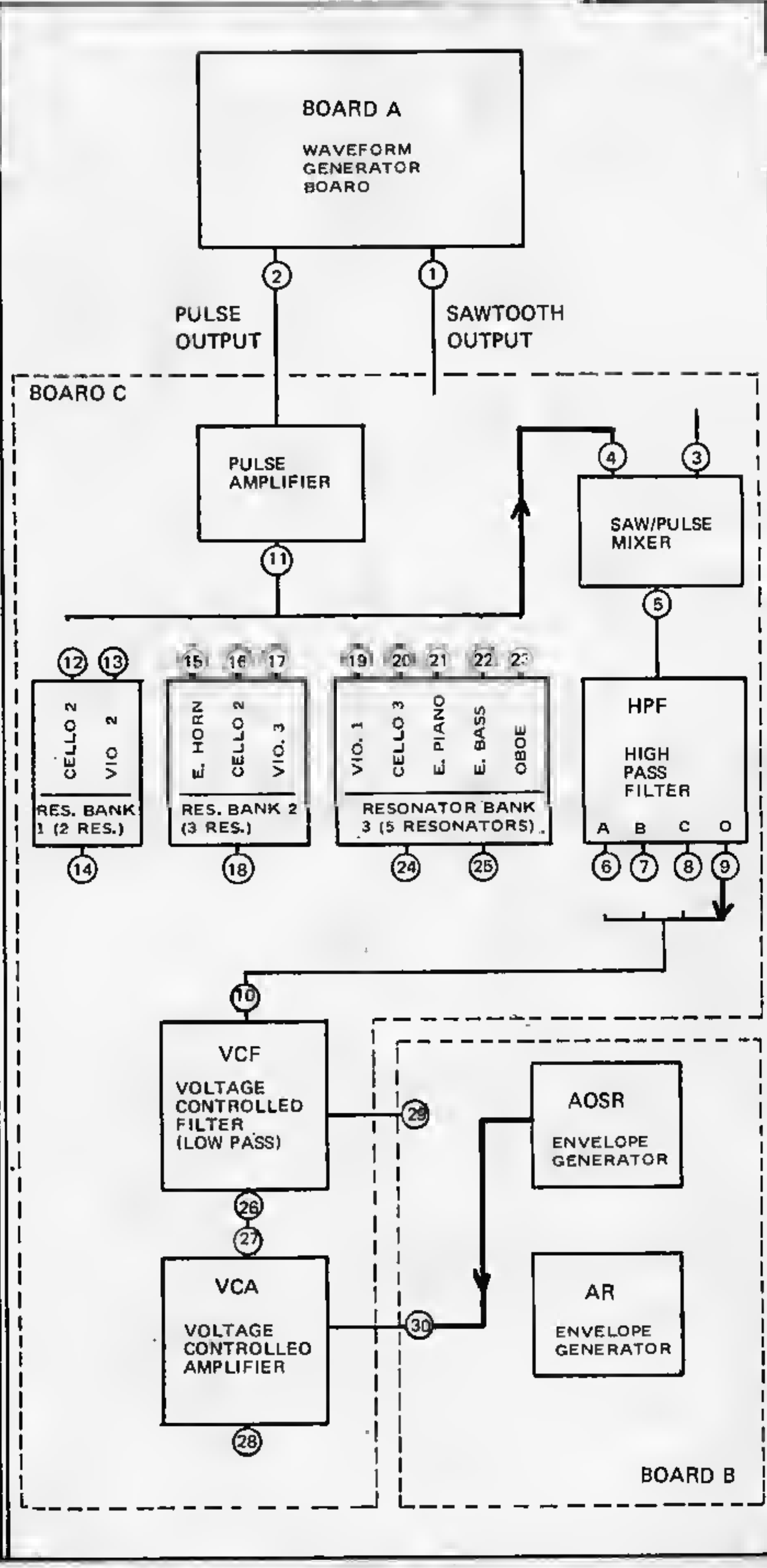



| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 0 | 0 | 1 | 0 | 1 |

**2701 VOICE FLOW CHART** **VOICE:SONG WHIST.**

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



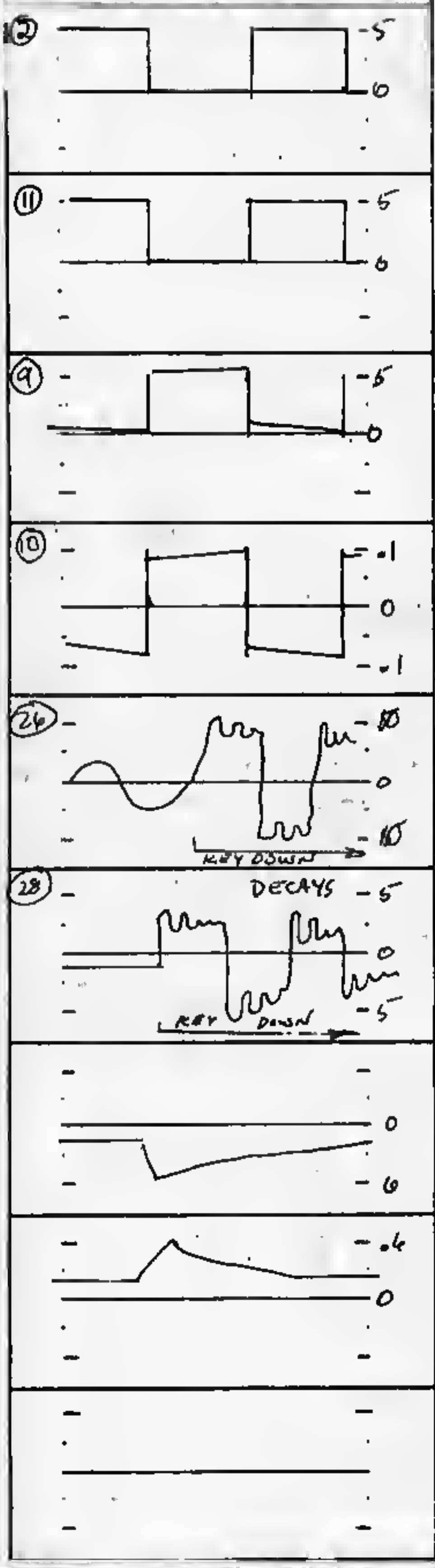



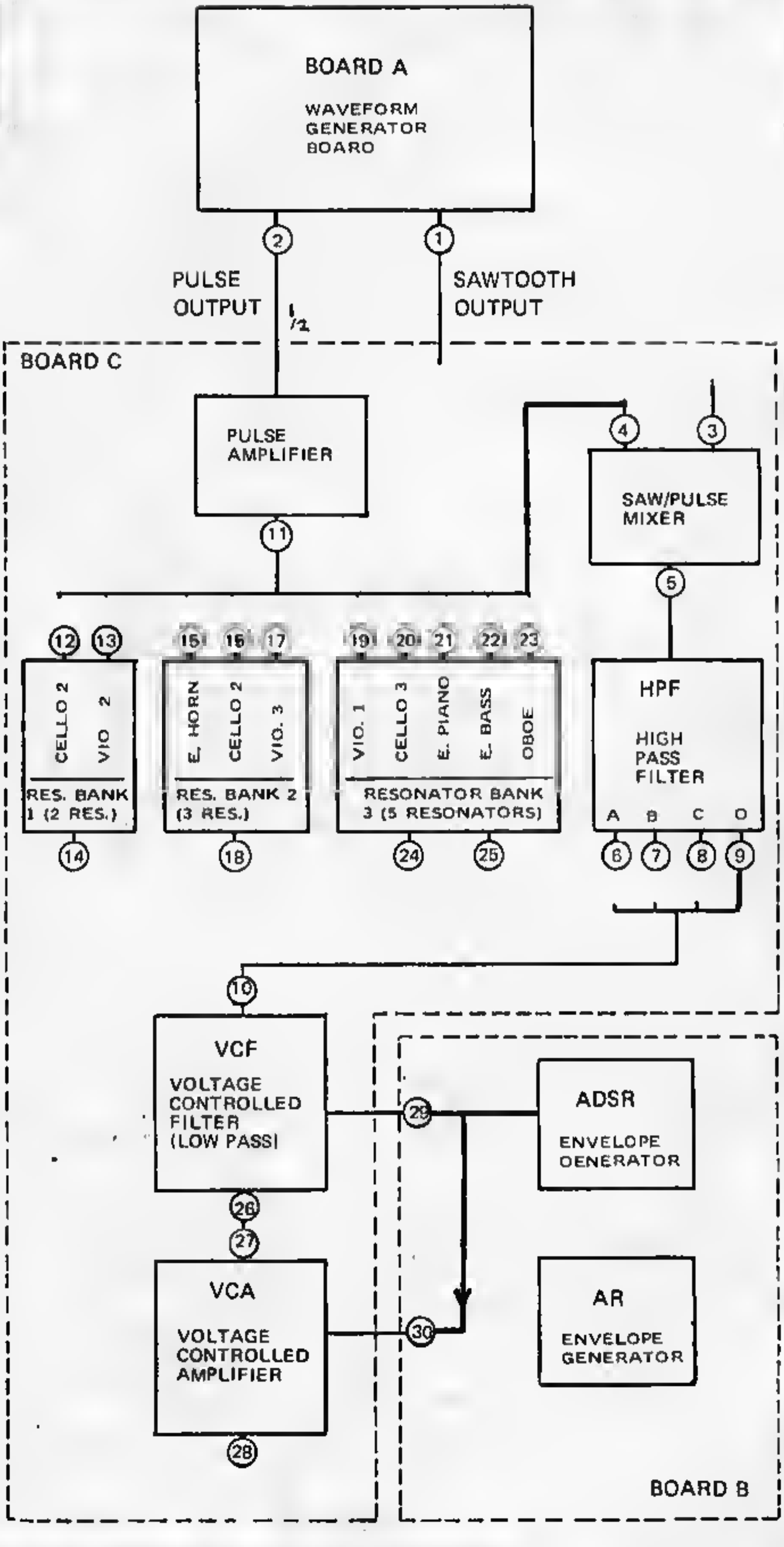
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 0 | 0 | 1 | 0 | 0 |

## 2701 VOICE FLOW CHART

**VOICE: TELSTAR**

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.

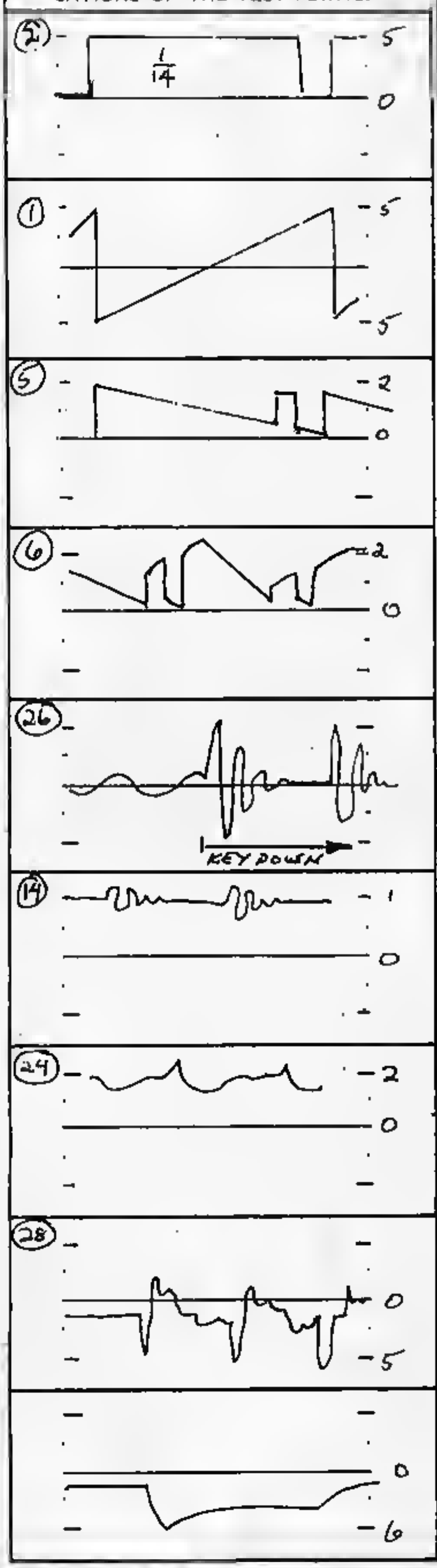


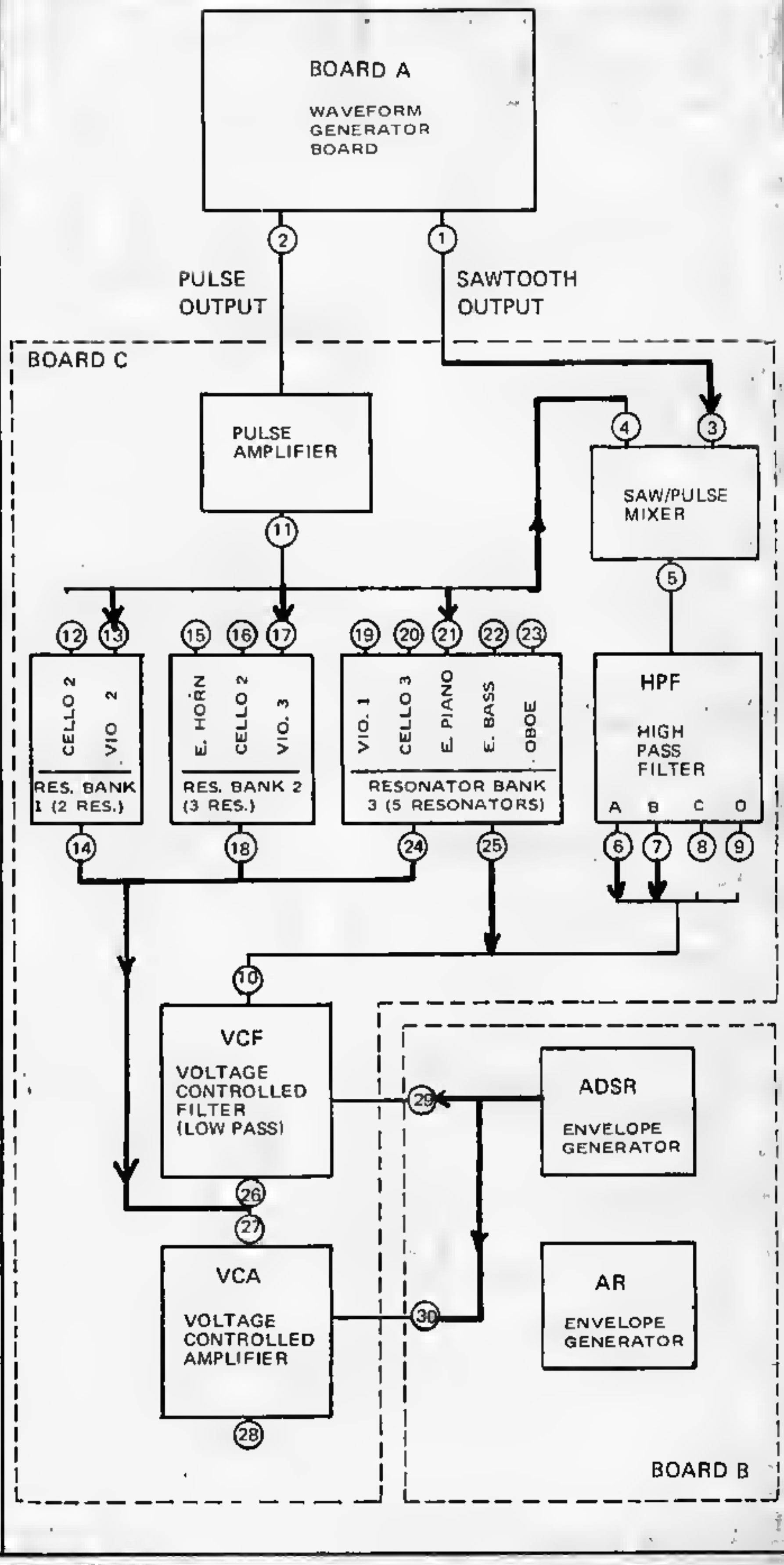



| VOICE CODE | A | B | C | D | E |
| --- | --- | --- | --- | --- | --- |
| | 0 | 0 | 0 | 1 | 1 |

**2701 VOICE FLOW CHART** **VOICE: SPACE REED**

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



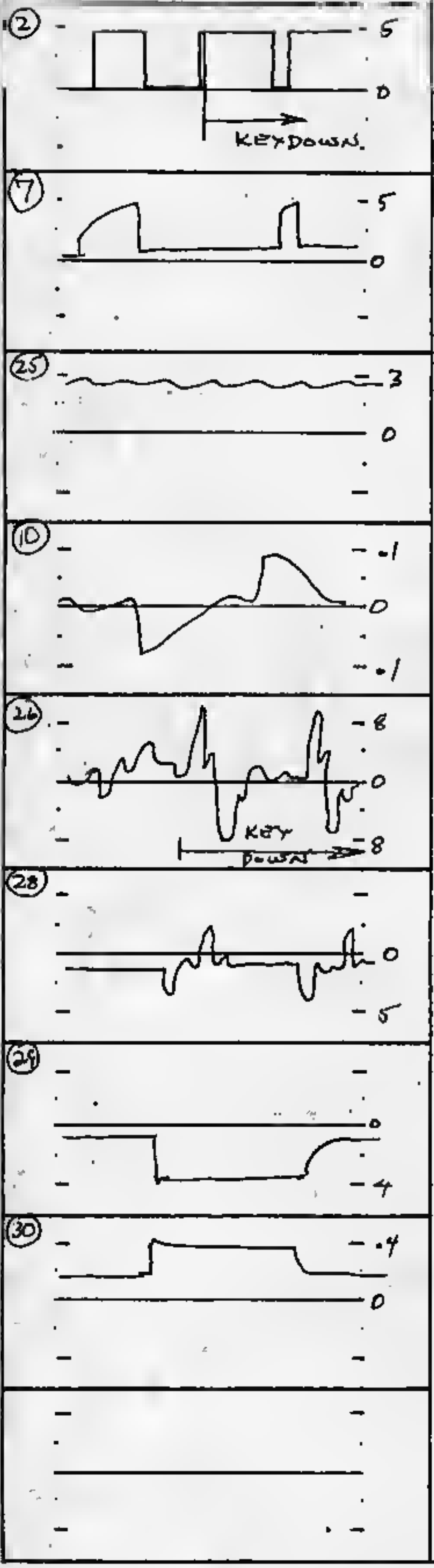



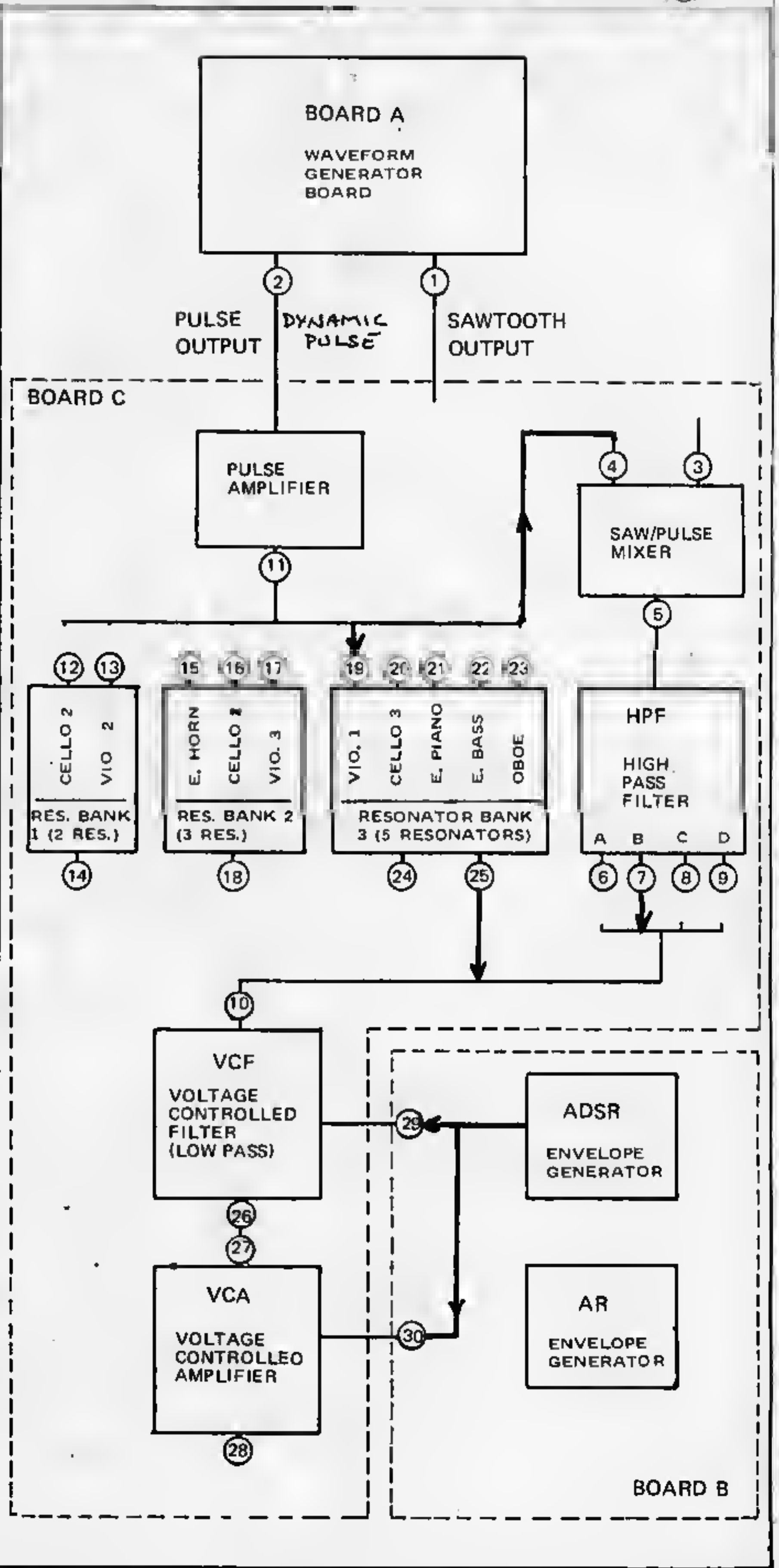
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 0 | 0 | 0 | 1 | 0 |

# 2701 VOICE FLOW CHART

**VOICE: SAX**

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.



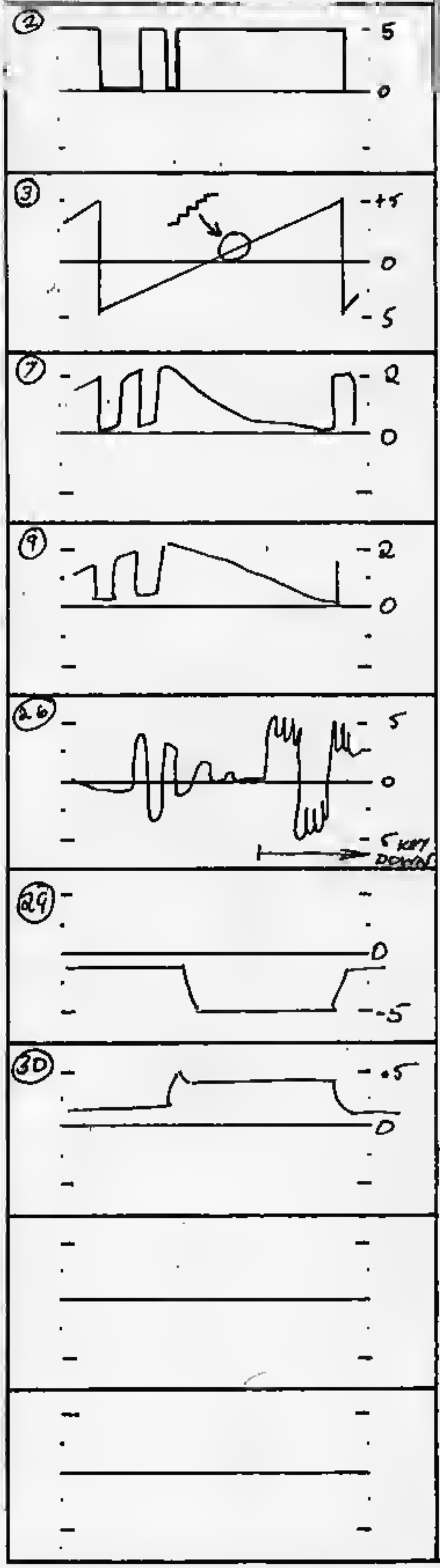
| VOICE CODE | A | B | C | D | E |
|---|---|---|---|---|---|
| | 0 | 0 | 0 | 0 | 1 |

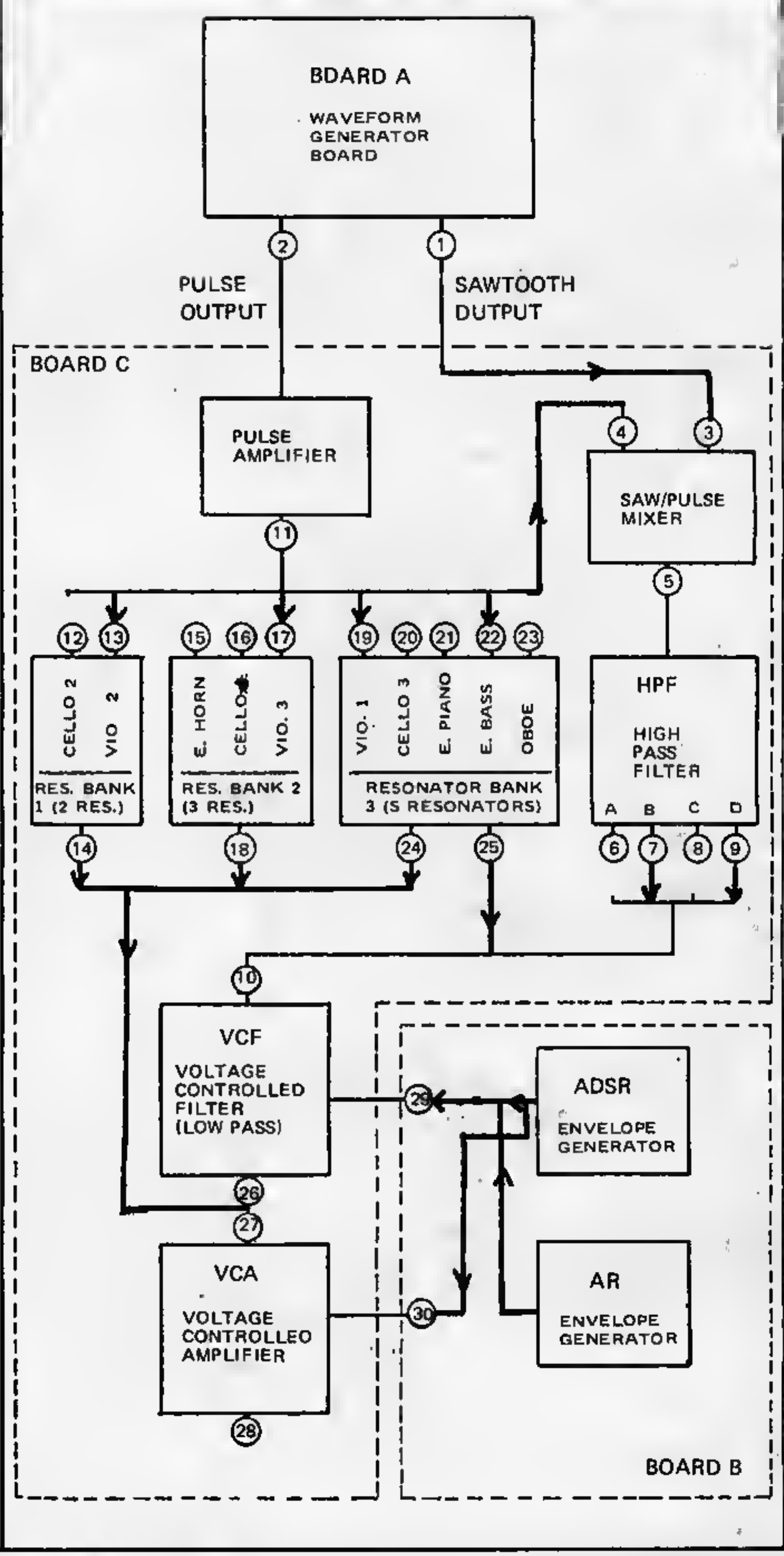
# 2701 VOICE FLOW CHART

**VOICE: Buzz Bassoon**

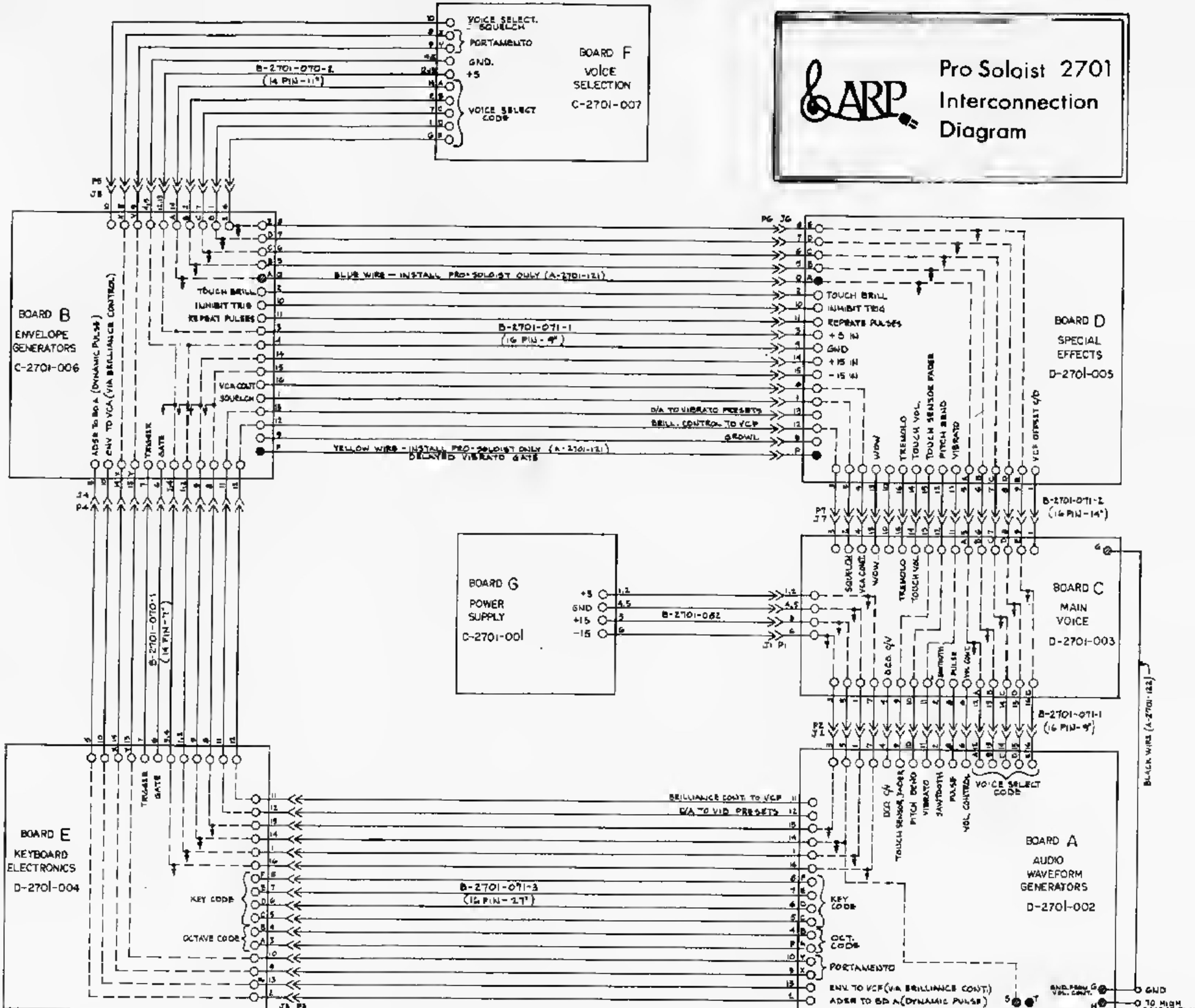
(30)

2701 BOARD TEST POINTS: REFER TO THE SCHEMATICS FOR BOARDS A, B & C FOR THE LOCATIONS OF THE TEST POINTS.

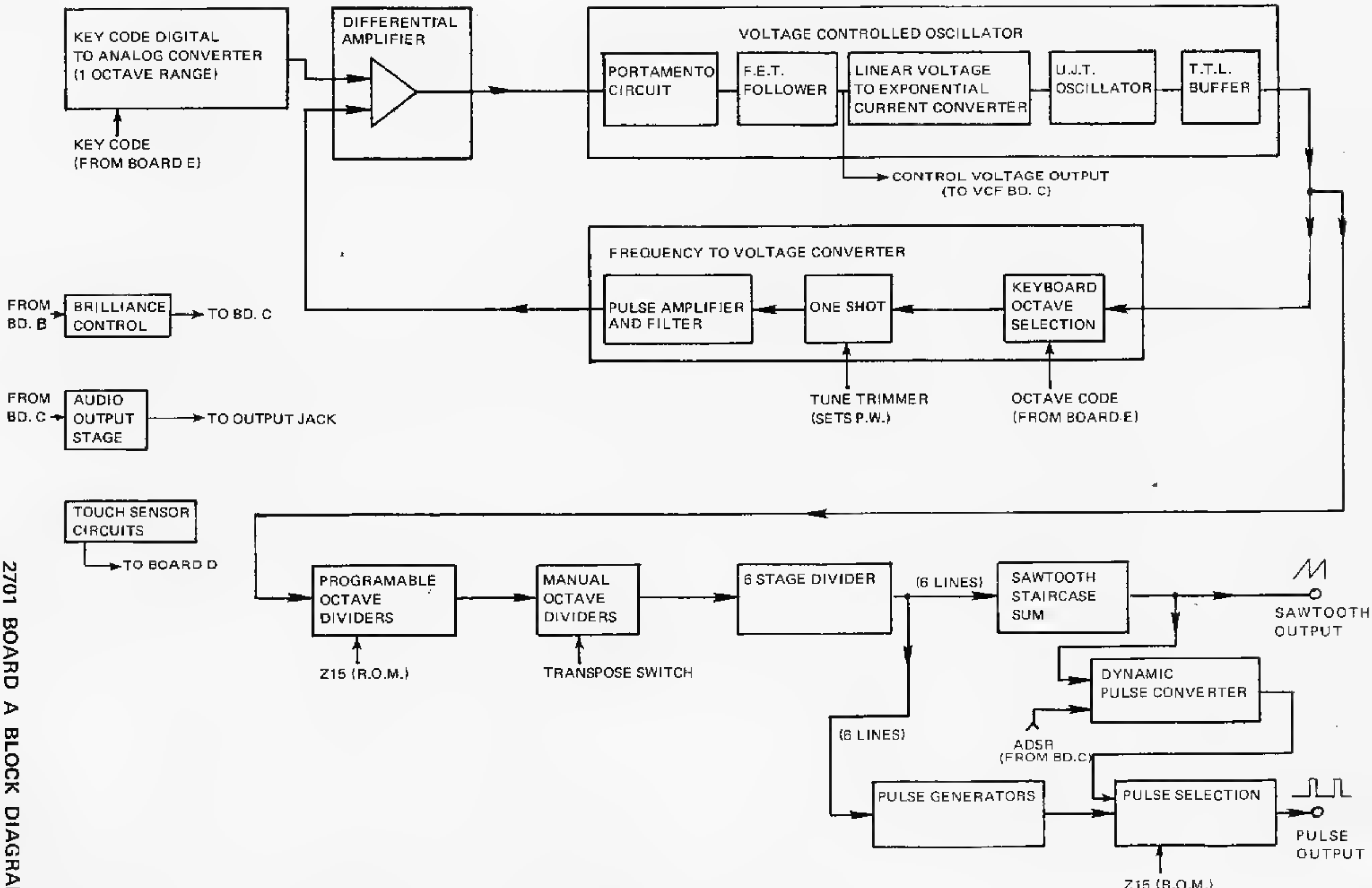


# Pro Soloist 2701 Interconnection Diagram

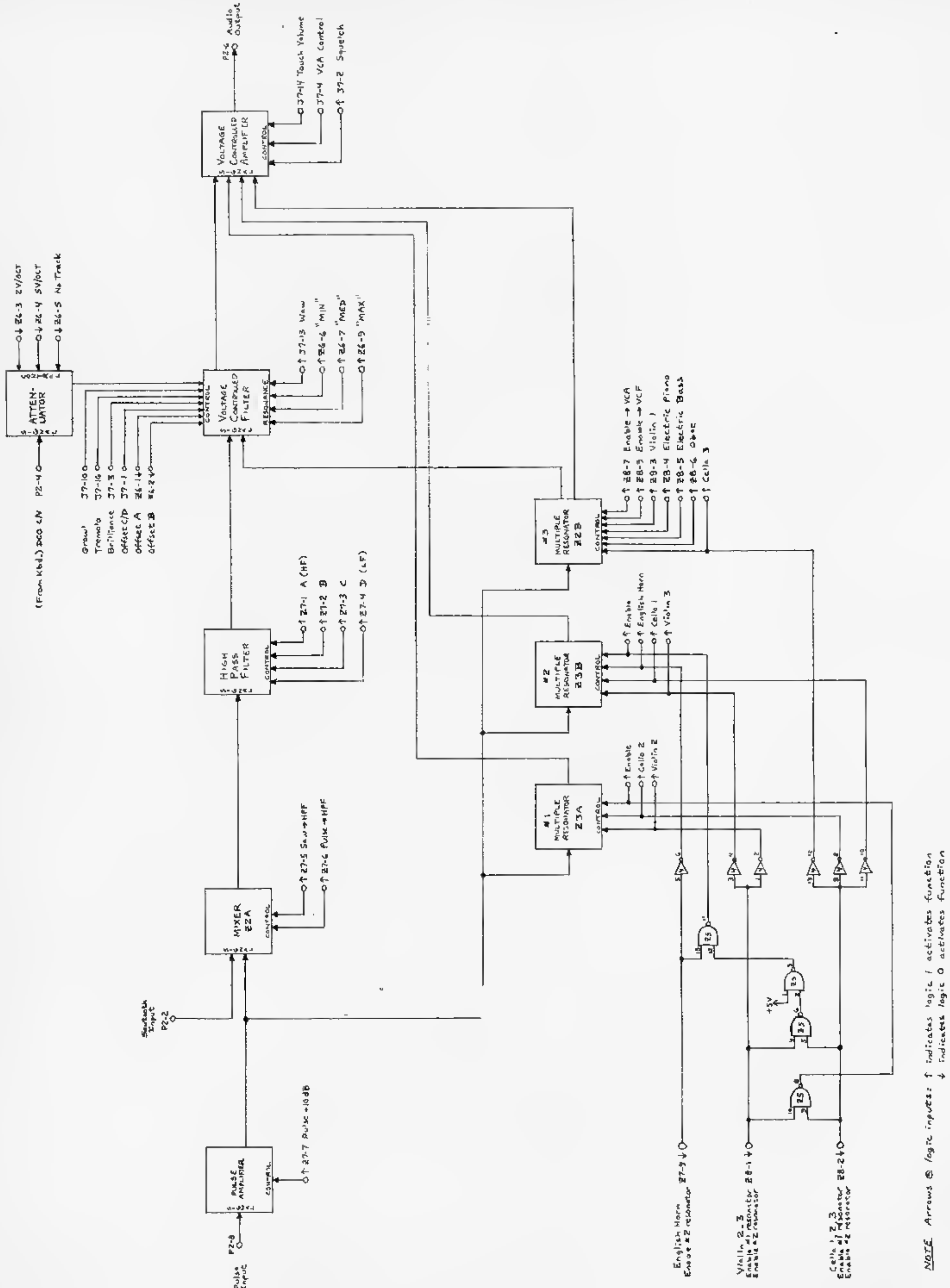


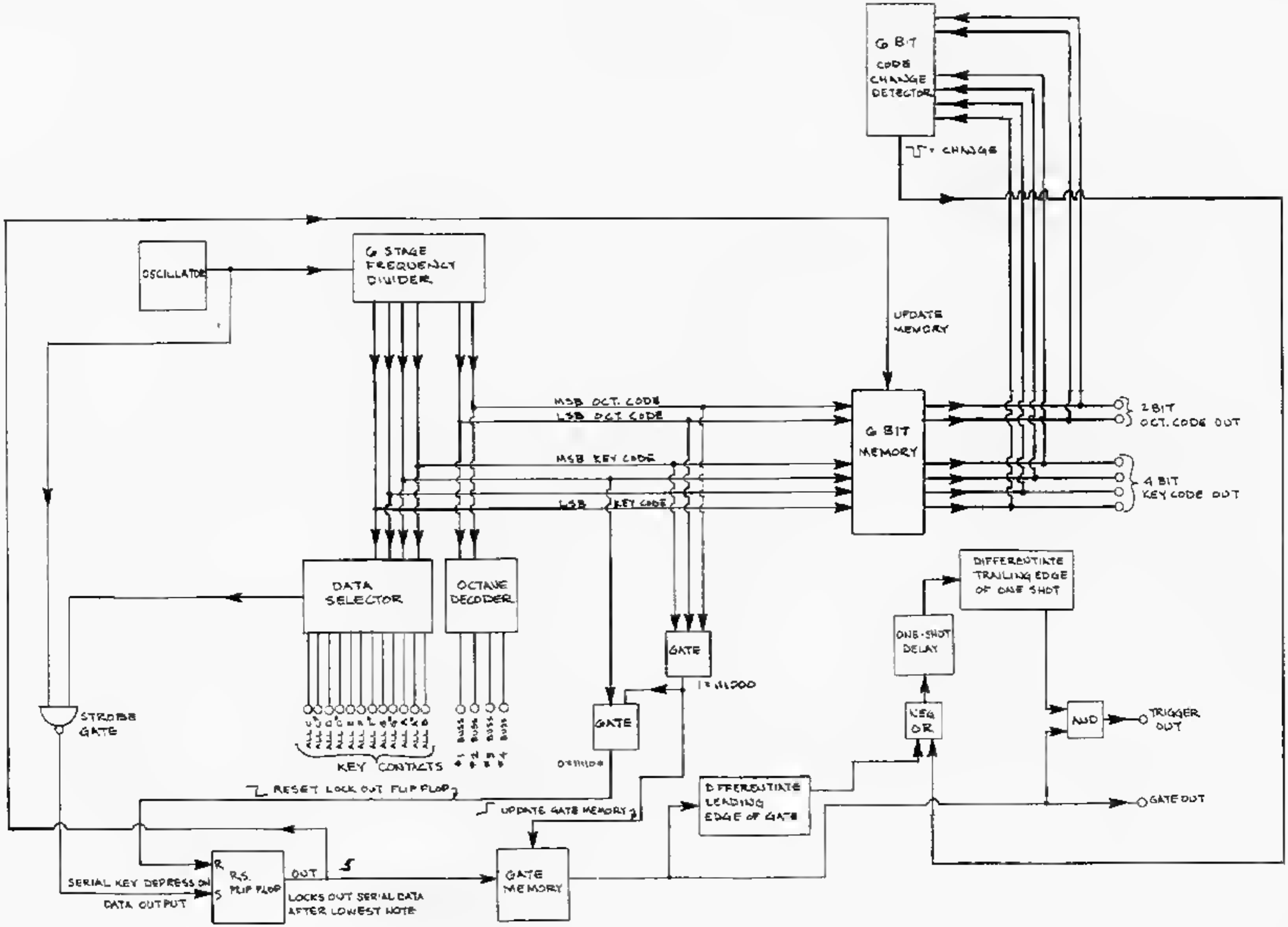
## 2701 BOARD A BLOCK DIAGRAM




2701 PRO SOLOIST BLOCK DIAGRAM BOARD A

## 2701 BOARD C BLOCK DIAGRAM

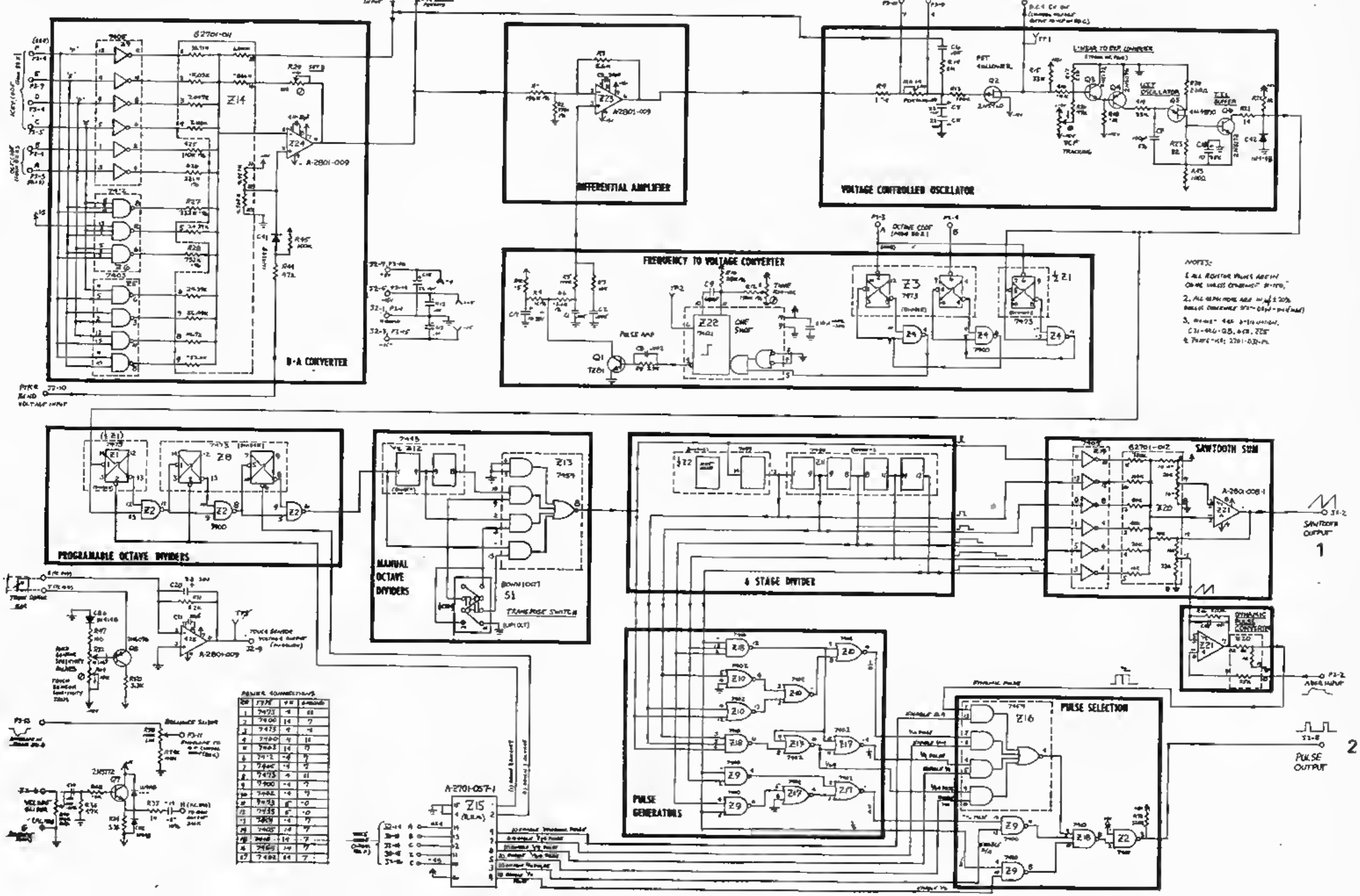


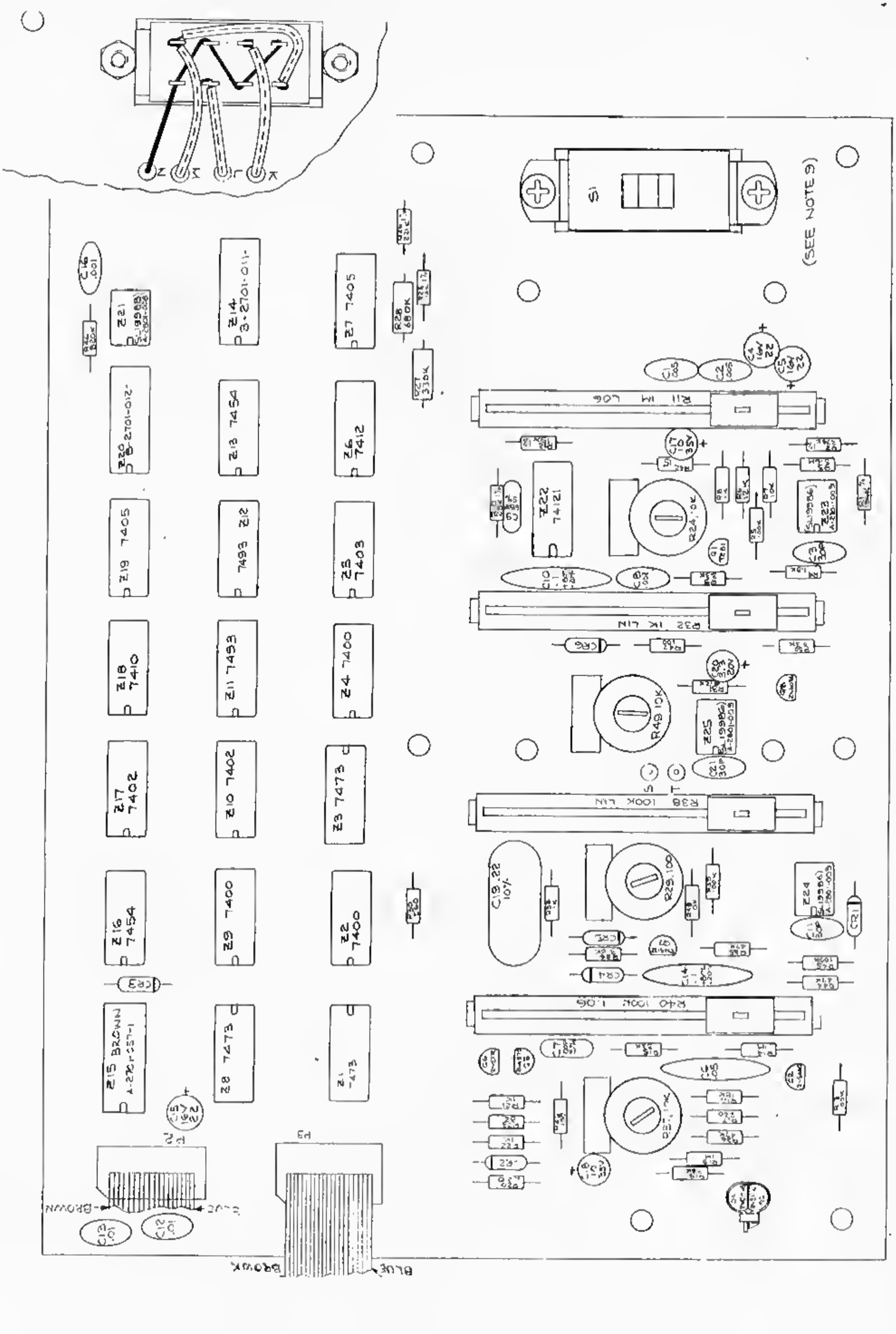



BOARD E BLOCK DIAGRAM

# 2701 BOARD A SCHEMATIC

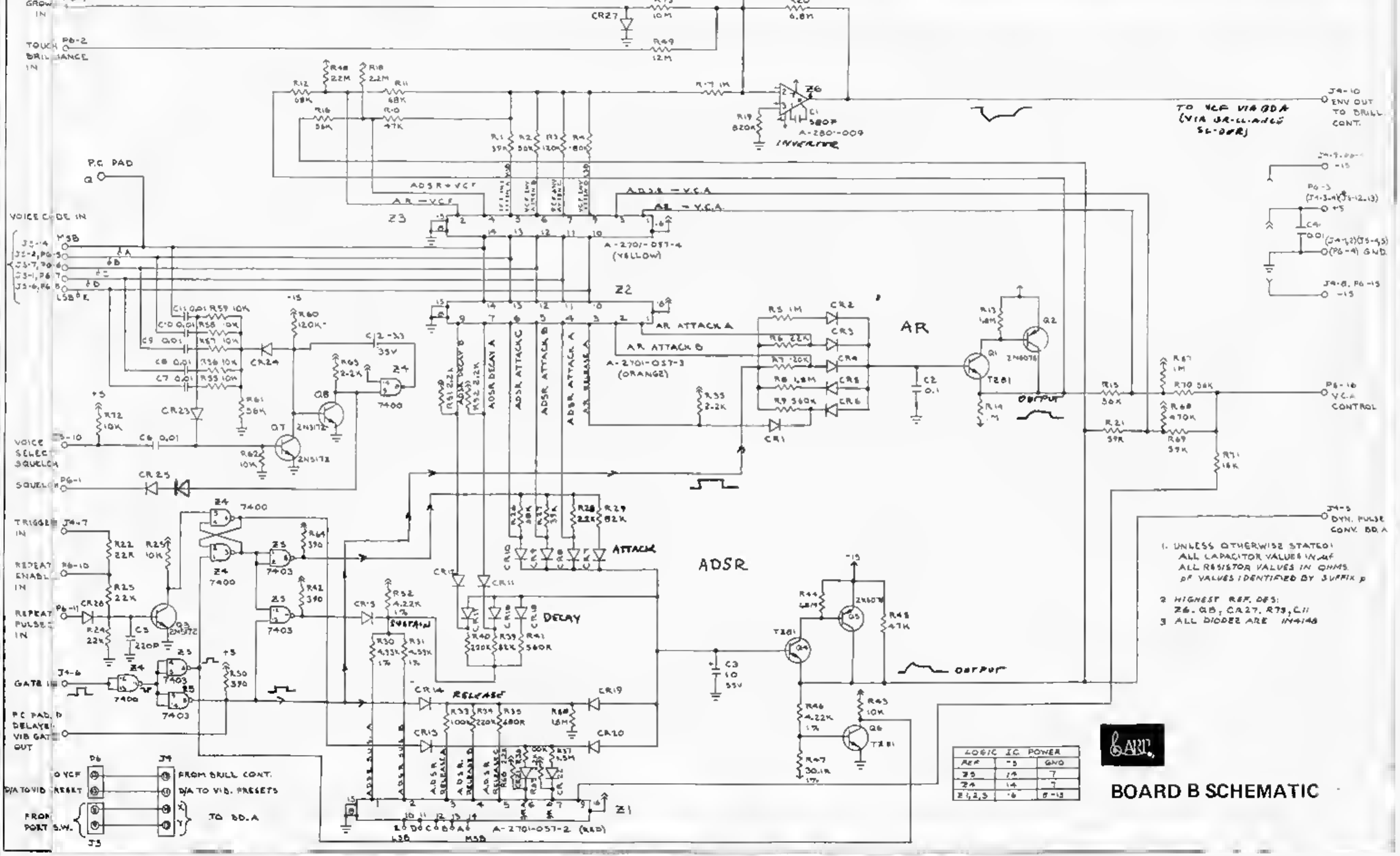
MANUFACTURED UNDER U.S. PATENT NUMBERS 3.930.429 AND 3.965.789.





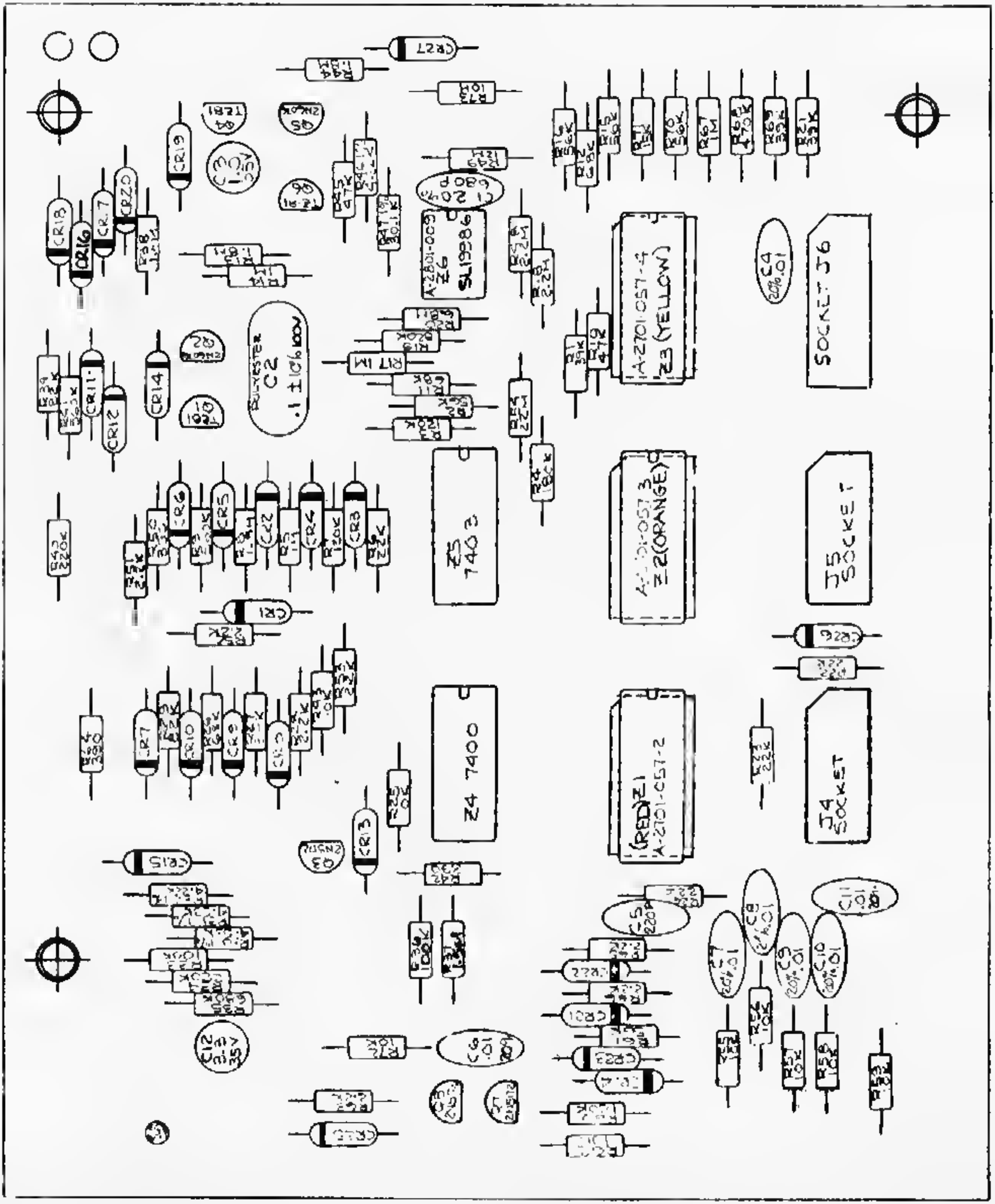

2701 BOARD A LAYOUT

MANUFACTURED UNDER U.S. PATENT NUMBERS 3.930.429 AND 3.965.789.



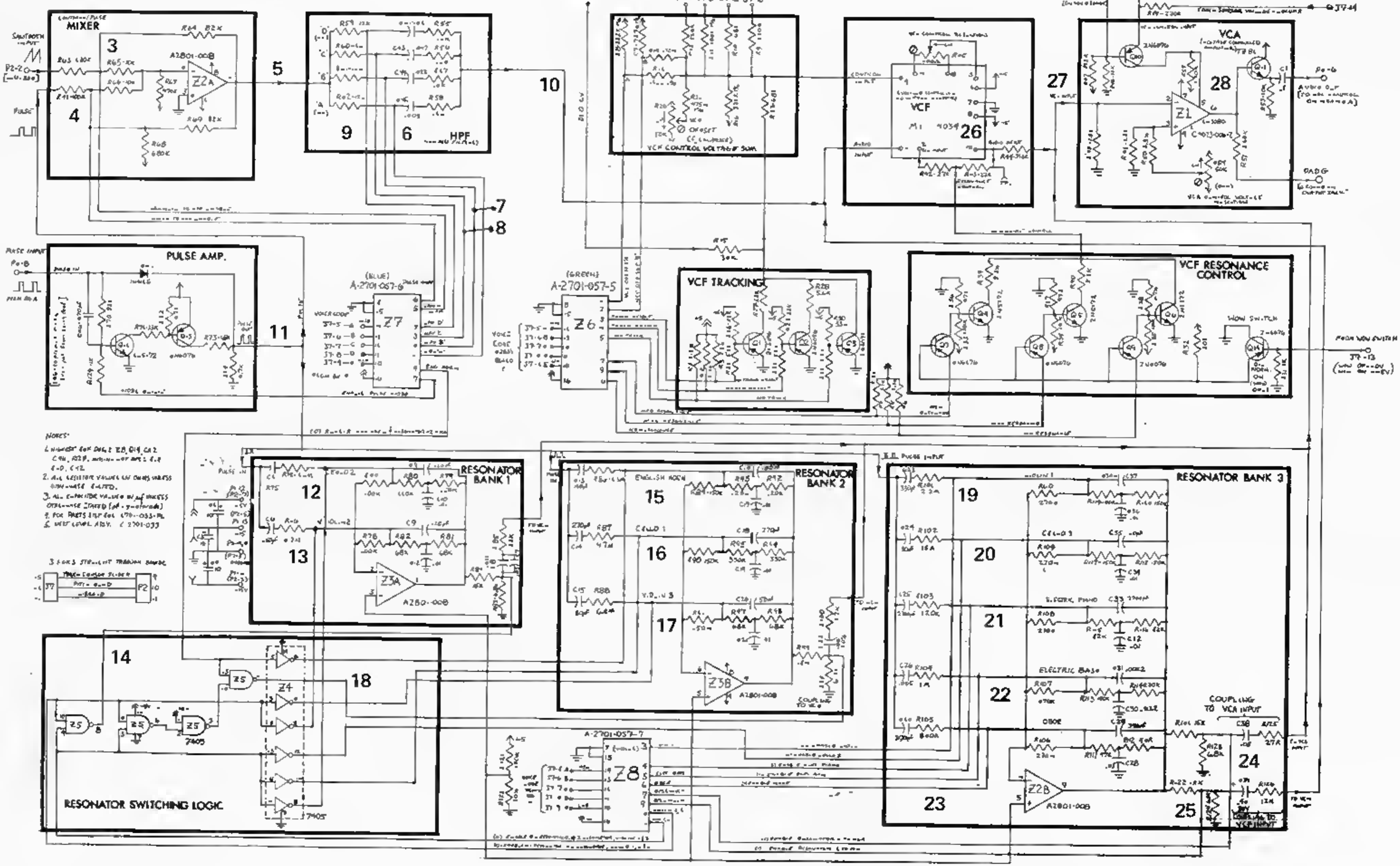

| LOGIC | I.C. | POWER |
|---|---|---|
| REF | +5 | GND |
| Z5 | 14 | 7 |
| Z4 | 14 | 7 |
| Z1,2,3 | 16 | 8 −15 |

# BOARD B SCHEMATIC



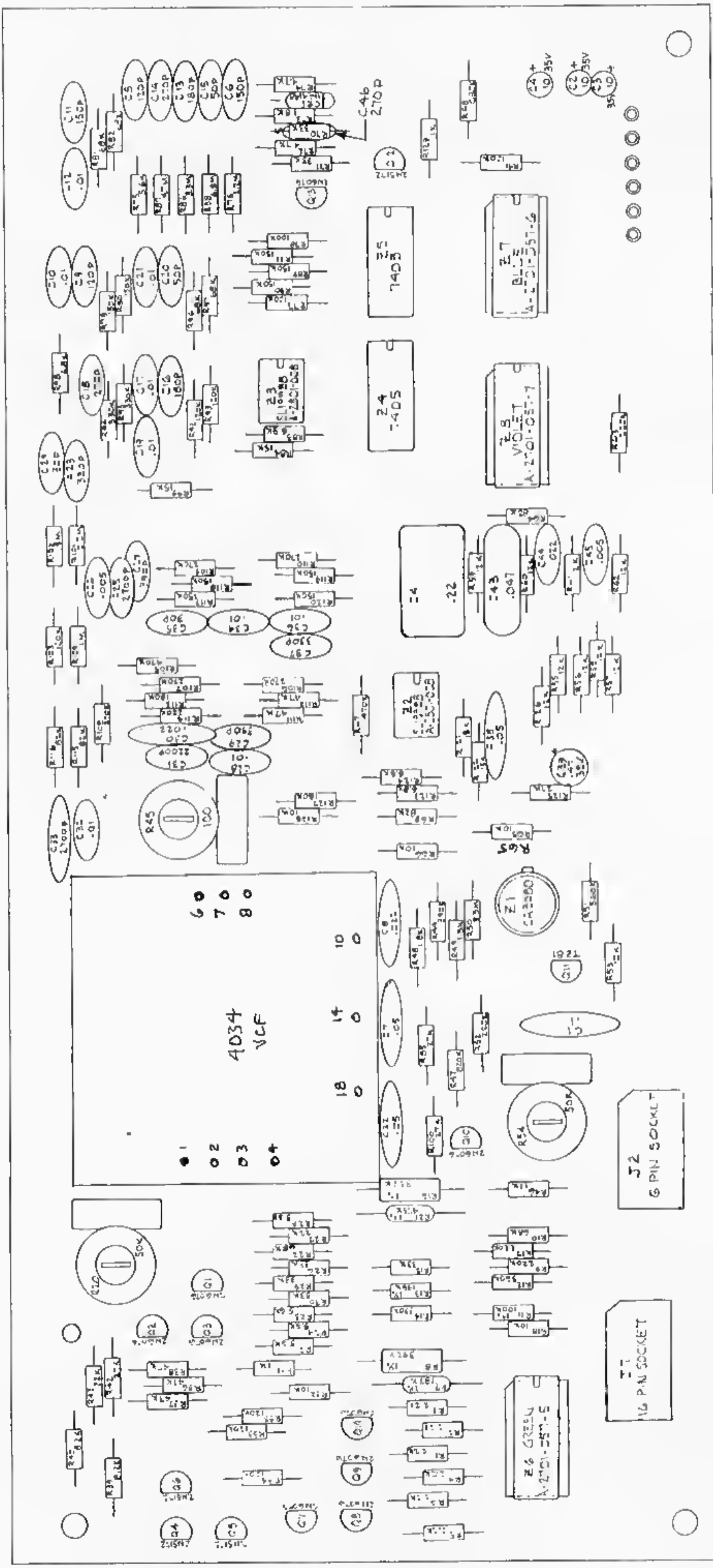
Z5 7403
Z4 7400
A-2701-057-4 Z3 (YELLOW)
A-2701-057-3 Z2(ORANGE)
(RED)Z1 A-2701-057-2
SOCKET J6
J5 SOCKET
J4 SOCKET

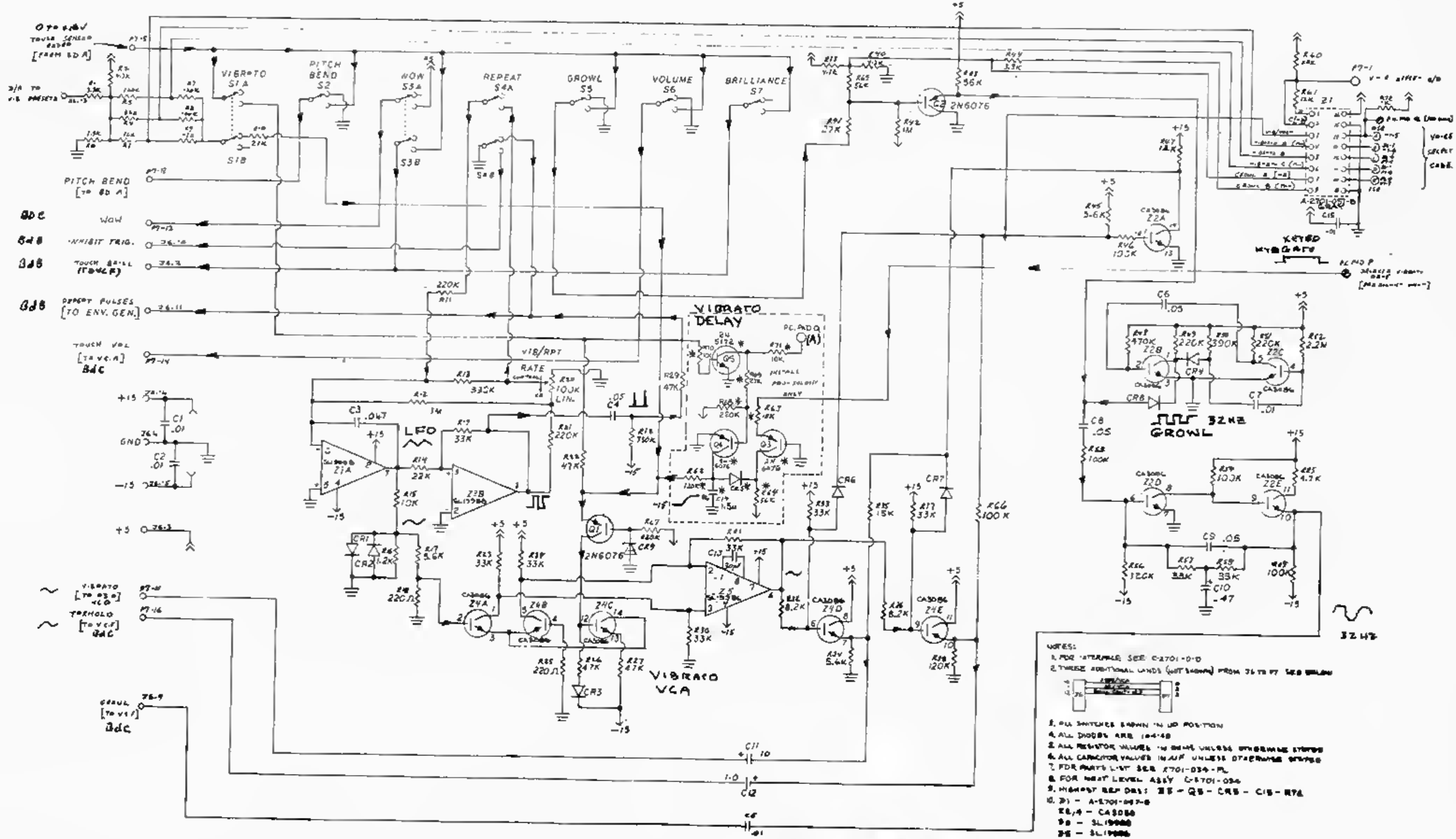
# 2701 BOARD C SCHEMATIC




MANUFACTURED UNDER U.S. PATENT NUMBERS 3,930,429 AND 3,965,789.

# 2701 BOARD C LAYOUT



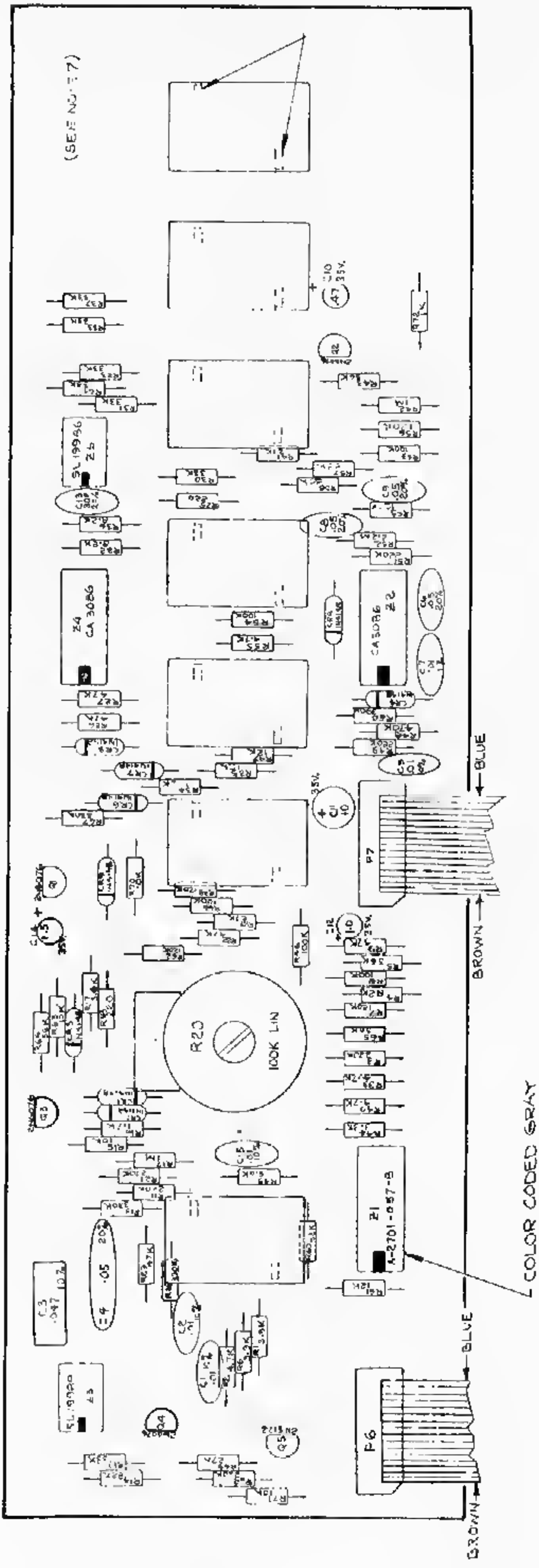


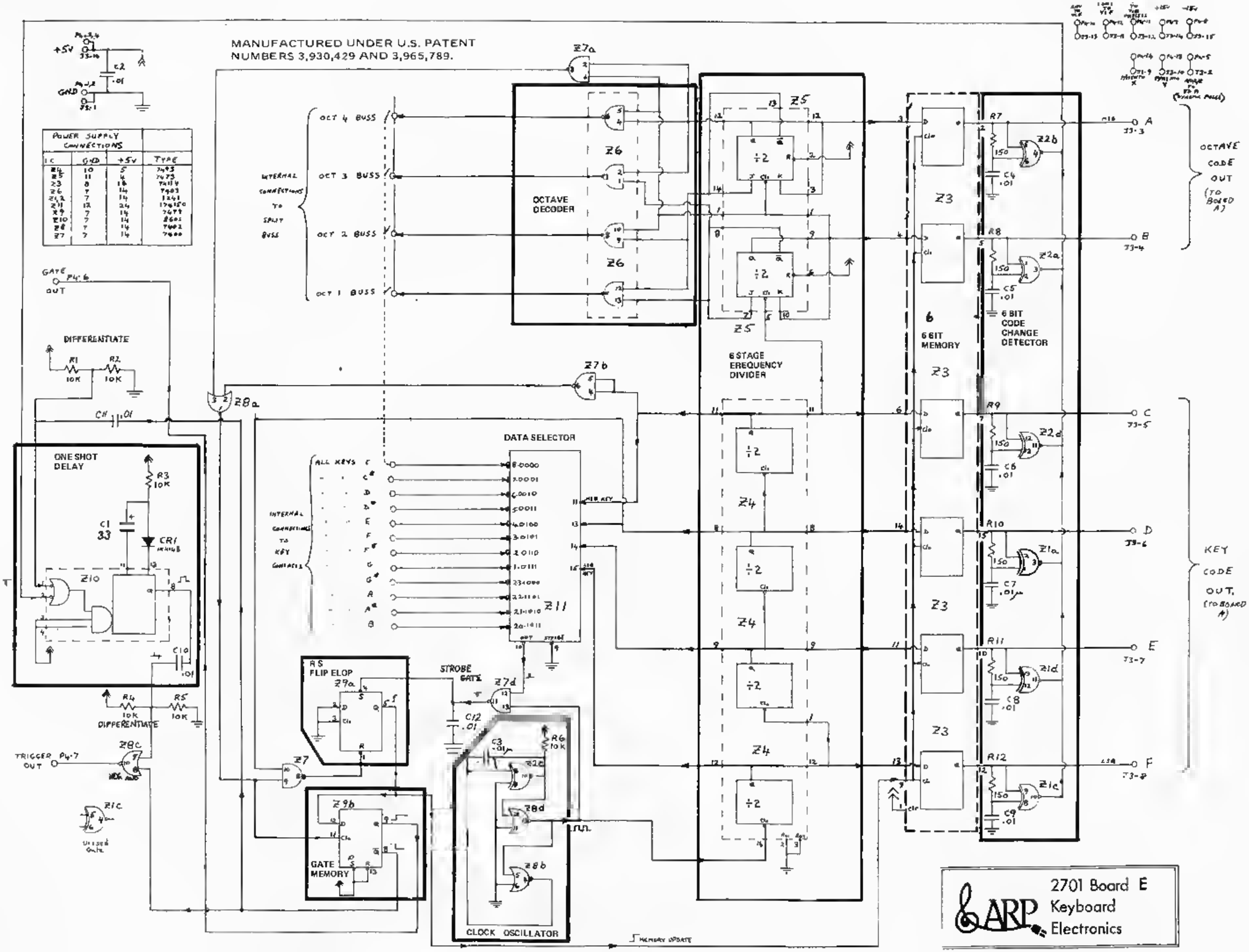

MANUFACTURED UNDER U.S. PATENT NUMBERS 3.930.429 AND 3.965.789.

| | | |
|---|---|---|
| -1 | ALL COMPONENTS SHOWN | PRO SOLOIST |
| -2 | ALL COMPONENTS EXCEPT THOSE MARKED * | SOLOIST MKII |

# 2701 BOARD D SCHEMATIC

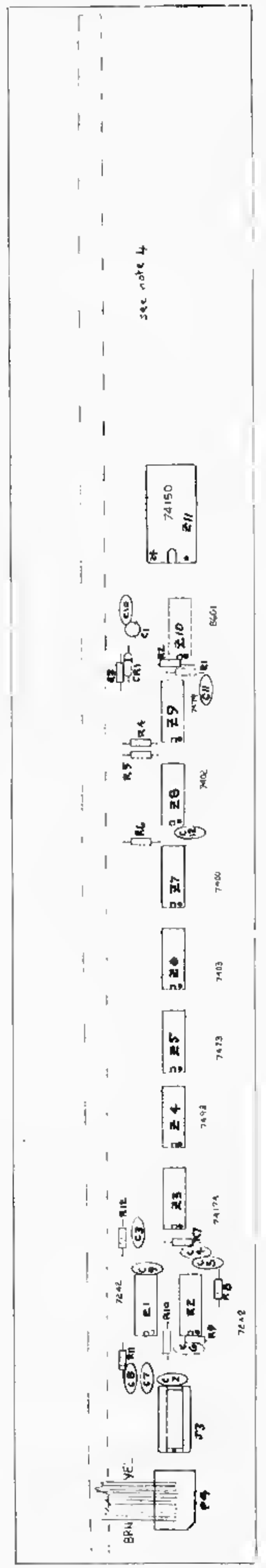
# 2701 BOARD D LAYOUT

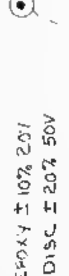





| POWER SUPPLY CONNECTIONS | | | |
|---|---|---|---|
| IC | GND | +5V | TYPE |
| Z4 | 10 | 5 | 7493 |
| Z5 | 11 | 4 | 7473 |
| Z3 | 8 | 16 | 74174 |
| Z6 | 7 | 14 | 7403 |
| Z1,2 | 7 | 14 | 1241 |
| Z11 | 12 | 24 | 74150 |
| Z9 | 7 | 14 | 7474 |
| Z10 | 7 | 14 | 8601 |
| Z8 | 7 | 14 | 7402 |
| Z7 | 7 | 14 | 7400 |

## BOARD E LAYOUT

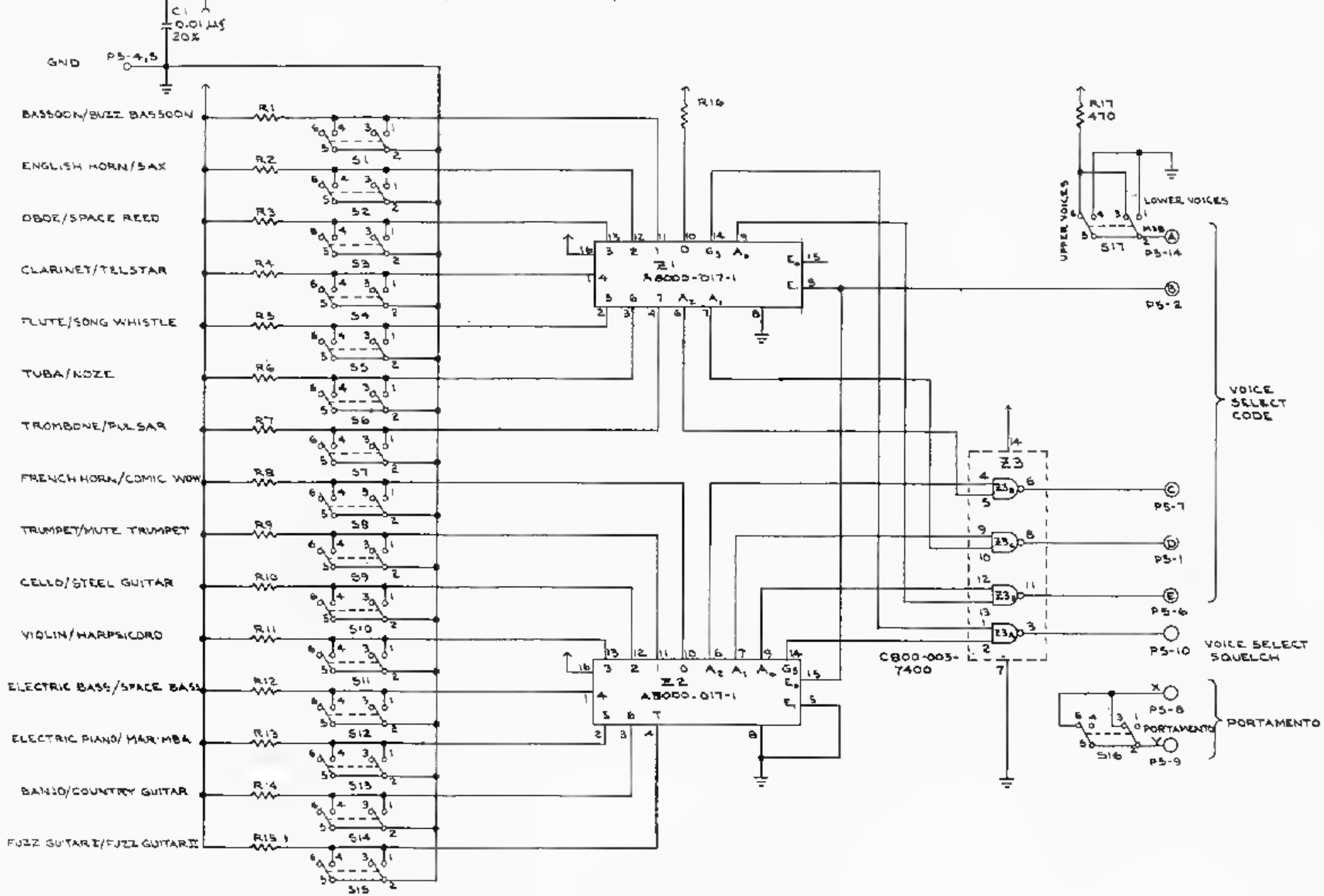


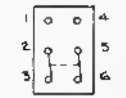




CR1 ~ 1N4148 DIODE
R1-R6 10K RESISTOR, CARBON FILM, ±5% 1/4W
R7-R12 150Ω " " " "
C1 3.3µf CAPACITOR, TANTALUM, EPOXY ±10% 20V
C2-C12 .01µf CAPACITOR CERAMIC, DISC ±20% 50V

# BOARD F-II SCHEMATIC

MANUFACTURED UNDER U.S. PATENT
NUMBERS 3,930,429 AND 3,965,789.



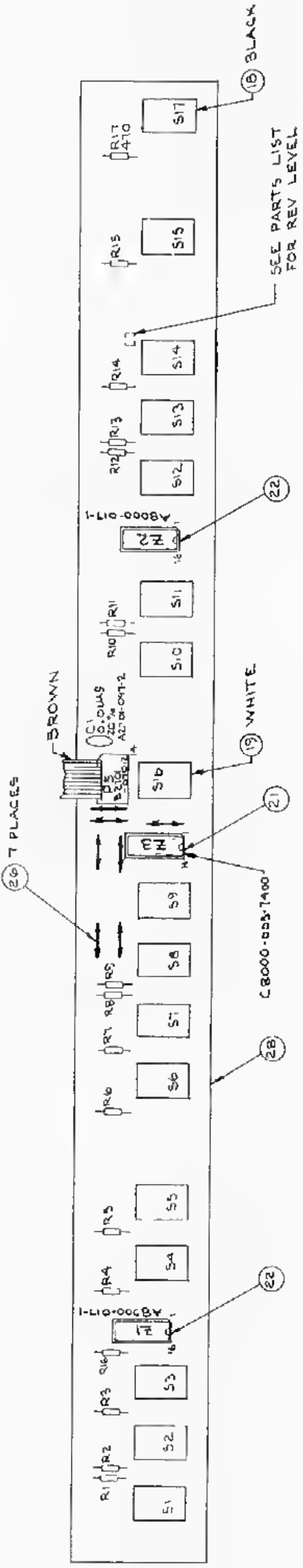



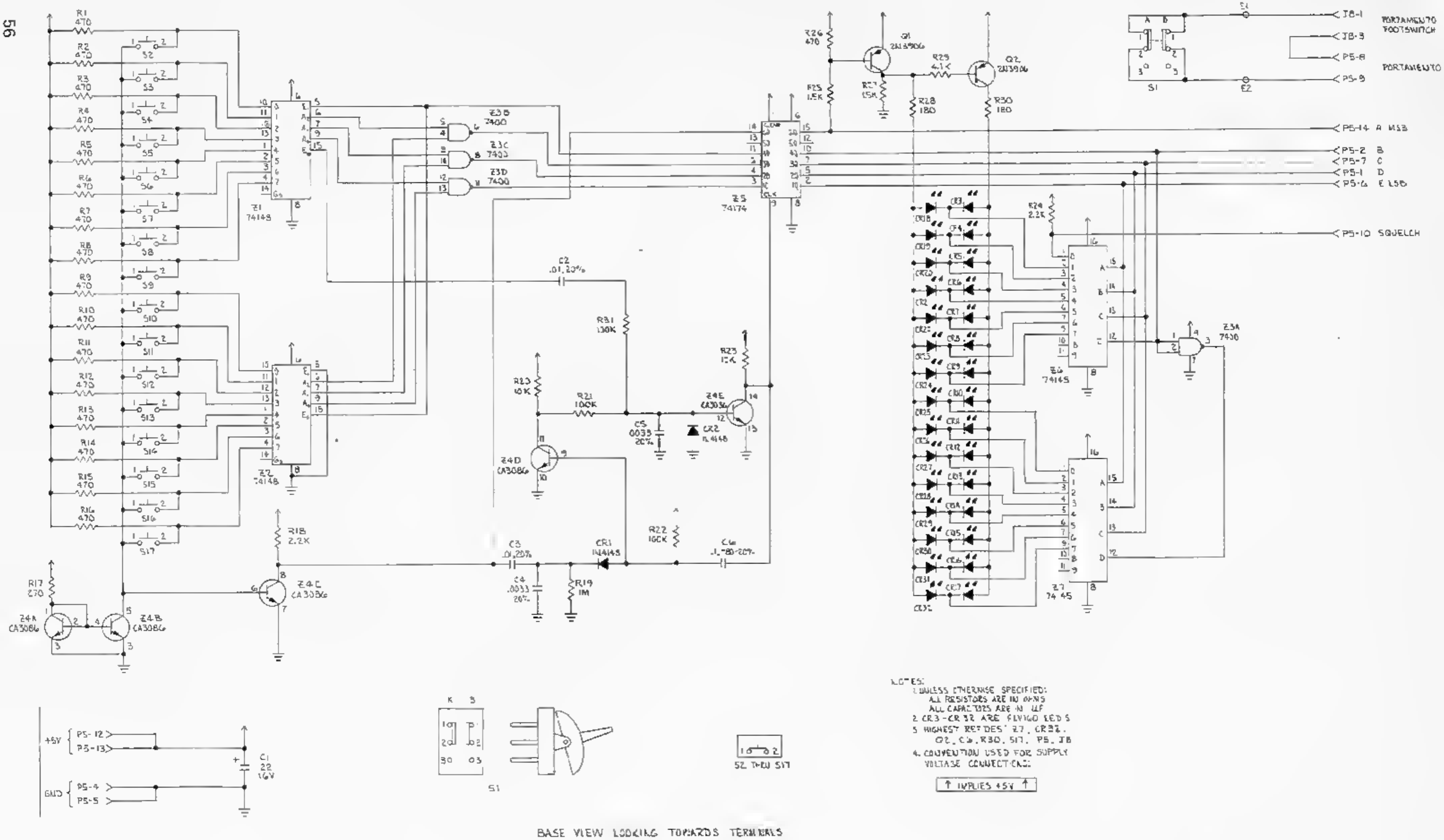

| VOICE SELECT CODE LIST | | | | | |
|---|---|---|---|---|---|
| LOWER VOICE | UPPER VOICE | OUTPUT CODE | | | |
| A-O | A-1 | B | C | D | E |
| BUZZ BASSOON | BASSOON | 0 | 0 | 0 | 1 |
| SAX | ENGLISH HORN | 0 | 0 | 1 | 0 |
| SPACE REED | OBOE | 0 | 0 | 1 | 1 |
| TELSTAR | CLARINET | 0 | 1 | 0 | 0 |
| SONG WHISTLE | FLUTE | 0 | 1 | 0 | 1 |
| NOZE | TUBA | 0 | 1 | 1 | 0 |
| PULSAR | TROMBONE | 0 | 1 | 1 | 1 |
| COMIC WOW | FRENCH HORN | 1 | 0 | 0 | 0 |
| MUTE TRUMPET | TRUMPET | 1 | 0 | 0 | 1 |
| STEEL GUITAR | CELLO | 1 | 0 | 1 | 0 |
| HARPSICORD | VIOLIN | 1 | 0 | 1 | 1 |
| SPACE BASS | ELECTRIC BASS | 1 | 1 | 0 | 0 |
| MARIMBA | ELECTRIC PIANO | 1 | 1 | 0 | 1 |
| COUNTRY GUITAR | BANJO | 1 | 1 | 1 | 0 |
| FUZZ GUITAR II | FUZZ GUITAR I | 1 | 1 | 1 | 1 |

NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   ALL RESISTOR VALUES ARE IN OHMS
   R1 THRU R16 ARE 2.2K
2. SWITCHES SHOWN IN OFF POSITION (UP)
3. HIGHEST REF DES:
   C1, R17, S17 & Z3

# BOARD F-II LAYOUT

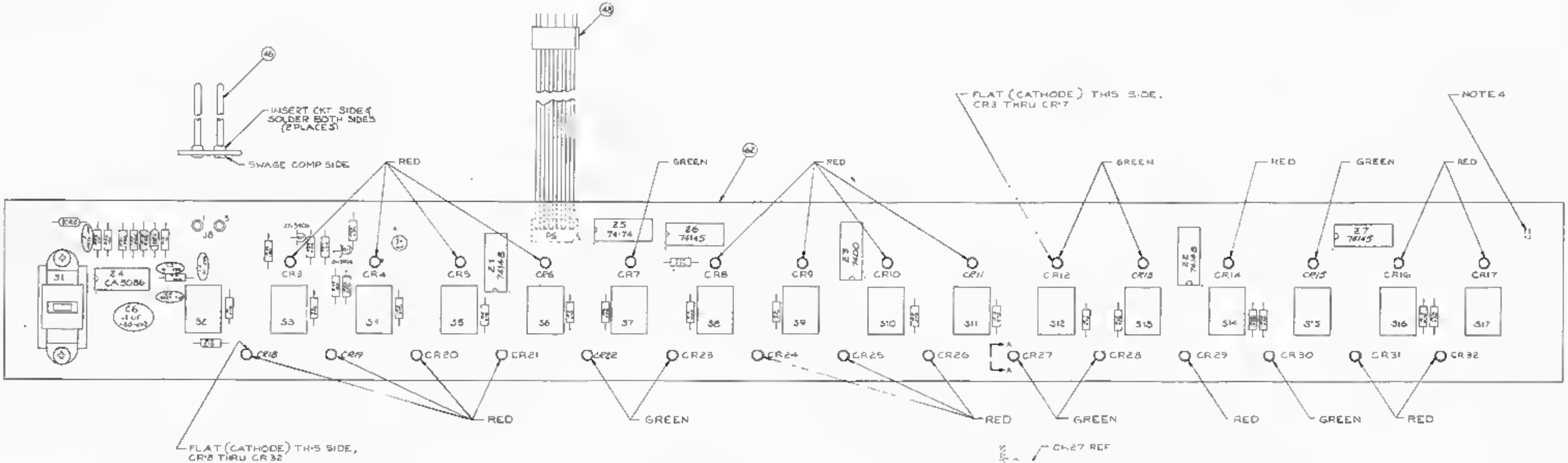


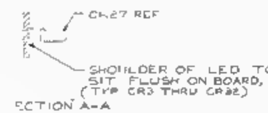



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
ALL RESISTORS ARE IN OHMS
ALL CAPACITORS ARE IN µF
2. CR3-CR32 ARE FLYING LEDS
3. HIGHEST REF DES: Z7, CR32, Q2, C6, R30, S17, P5, J8
4. CONVENTION USED FOR SUPPLY VOLTAGE CONNECTIONS:
↑ IMPLIES +5V ↑

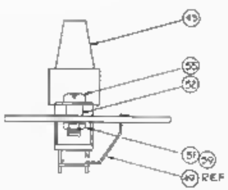
1 POS FILM PRINT @ 33%

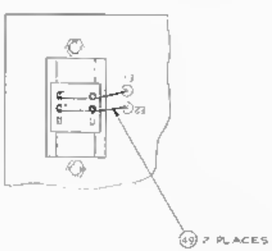
# PRO/DGX MODEL 2720
# BOARD F-III
# SCHEMATIC



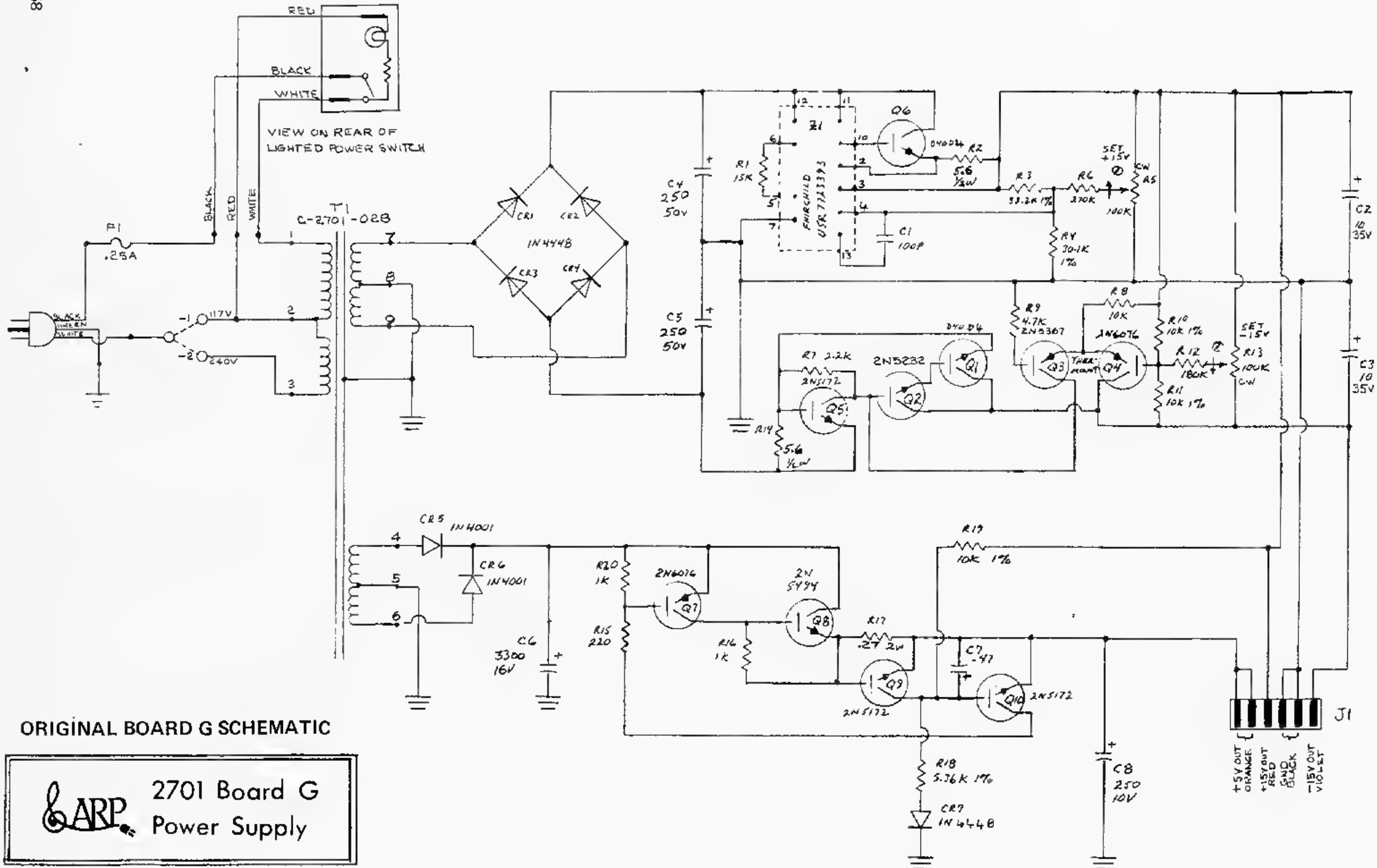




NOTES:
1. UNLESS OTHERWISE SPECIFIED:
RESISTOR VALUES ARE IN OHMS.
CAPACITOR VALUES ARE IN µf (P: PICOFARADS).
CR1&2 ARE 1N4148.
2. BEND DOWN PIN 1 AND ITS DIAGONAL COUNTERPART Z1 THRU Z7
3. FINISHED ASSY TO BE FREE OF EXCESS FLUX.
4. RUBBER STAMP REV LEVEL OF THIS DRAWING USING BLACK INK. COVER WITH CLEAR VARNISH, (BOTH SIDES).
5. FOR PARTS LIST, SEE PL 7211401.




# PRO/DGX MODEL 2720 BOARD F-III LAYOUT



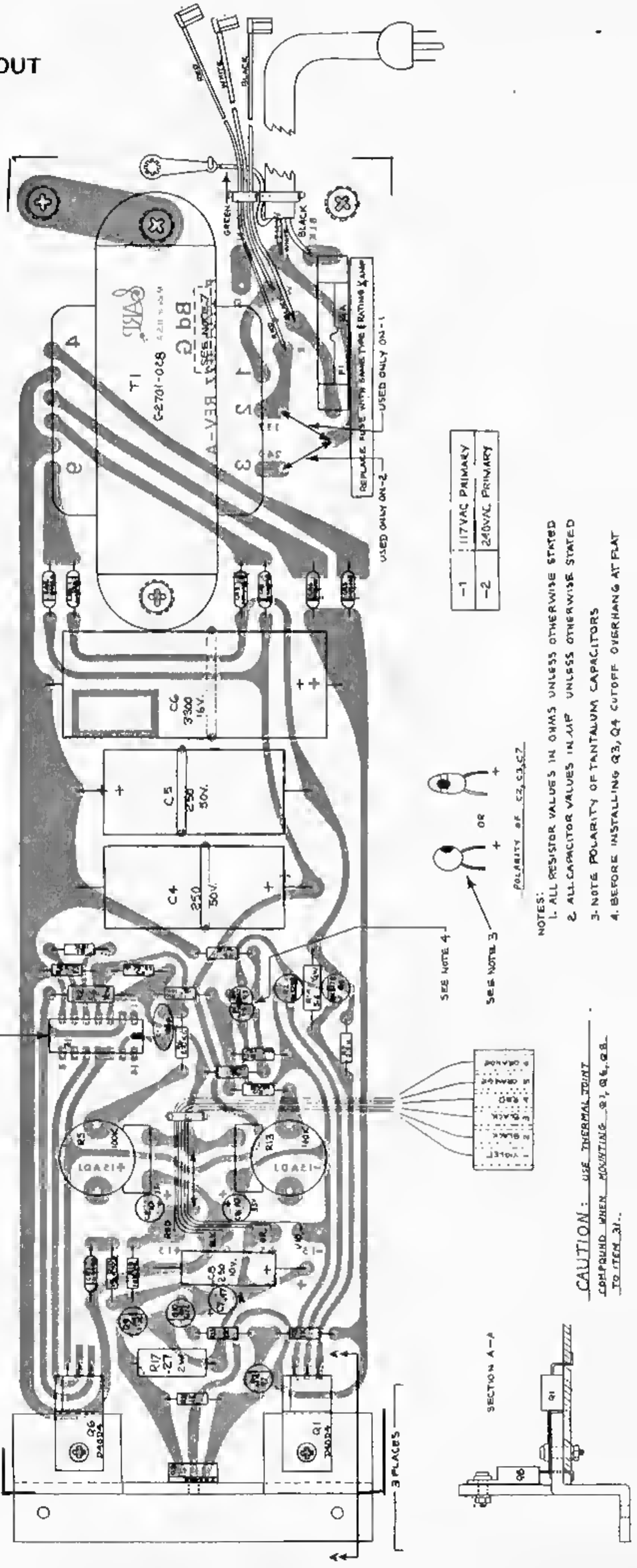

ORIGINAL BOARD G SCHEMATIC

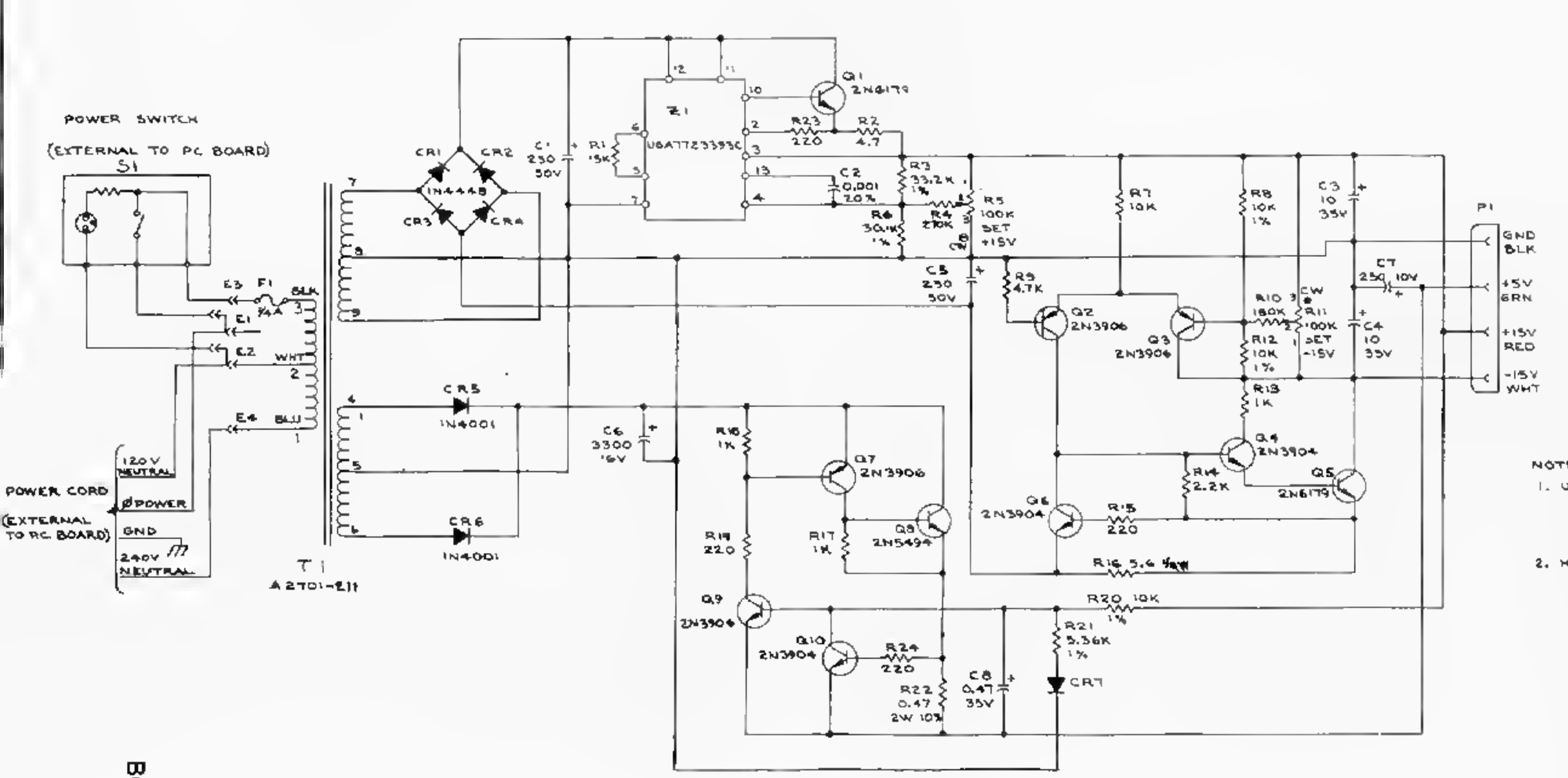
ARP

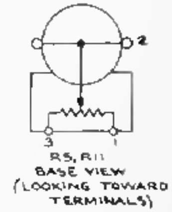
2701 Board G
Power Supply

# ORIGINAL BOARD G LAYOUT

component side view





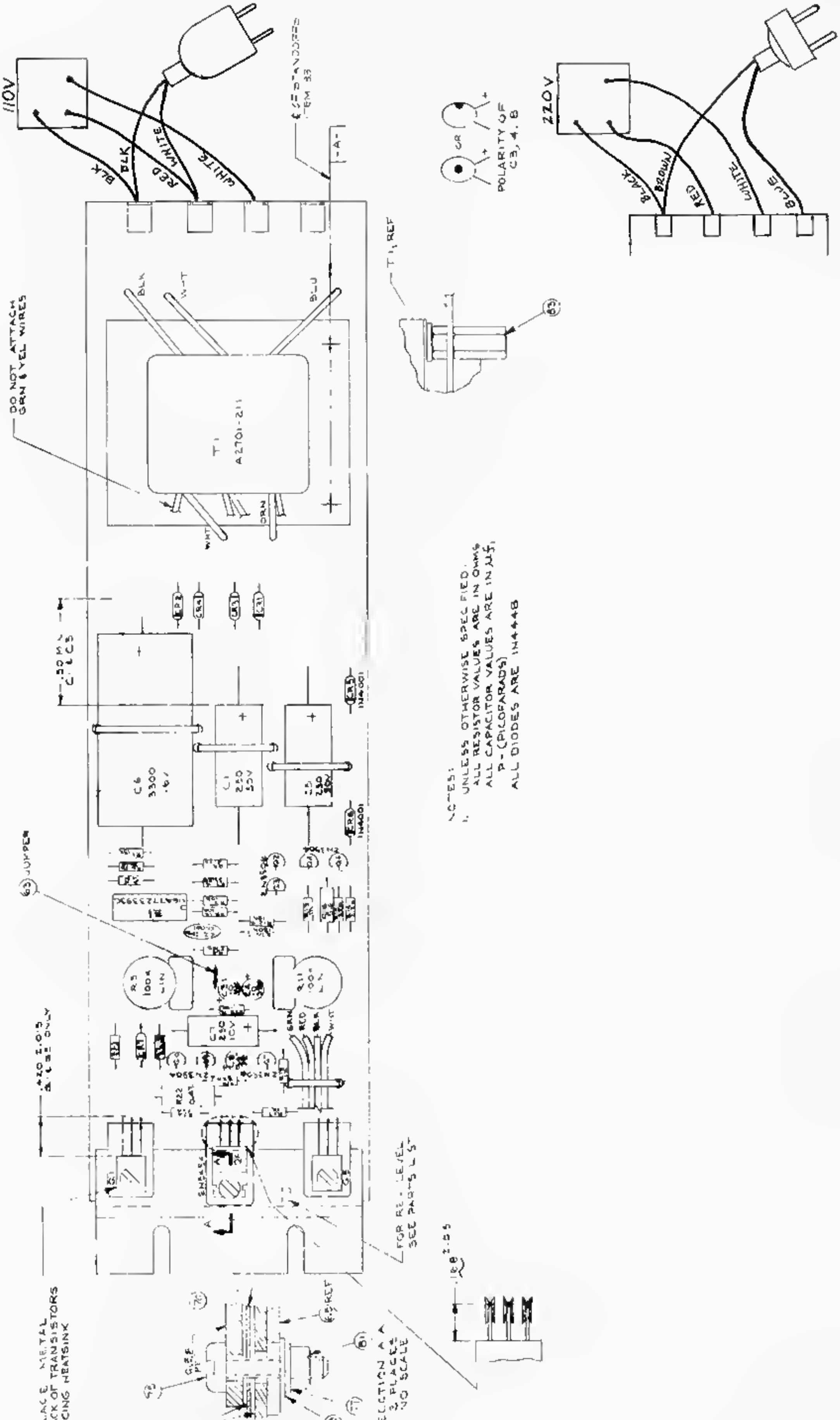




NOTES:

1. UNLESS OTHERWISE SPECIFIED: ALL RESISTOR VALUES ARE IN OHMS. ALL CAPACITOR VALUES ARE IN µF (P = PICOFARADS)
2. HIGHEST REF. DES. C8, CR7, E4, F1, P1, Q10, R24, S1, T1, Z1

MANUFACTURED UNDER U.S. PATENT NUMBERS 3,930,429 AND 3,965,789.

# BOARD G-II SCHEMATIC REVISED




**BOARD G- II LAYOUT**
**REVISED**

# PARTS LIST

## BOARD A

| REFERENCE | ARP PART NUMBER | ARP/MFG NUMBER | DESCRIPTION |
|---|---|---|---|
| Z7, Z19 | S602104 | C-8000-00S-740S | I.C. HEX INVERTER - O/C CDLL |
| Z14 | 5700401 | B-2701-011-B | I.C. CERMET RESISTOR PACK |
| Z23,24,2S | 1400801 | A-2801-009 | I.C. DPERATIONAL AMP (LM301AN) |
| Z6 | S602106 | C-8000-005-7412 | I.C. TRIPLE 3-I NAND GATE D/C COLL |
| Z5 | 1401901 | C-8000-005-7403 | I.C. DUAD 2-I NANO GATE O/C COLL |
| Z2,4,9 | 1401701 | C-8000-00S-7400 | I.C. DUAD 2-I NAND GATE |
| Z22 | 1402801 | C-8000-005-74121 | I.C. DNE SHOT MULTIVIBRATOR |
| Z1,3,8 | 1402501 | C-8000-005-7473 | I.C. DUAL TYPE J-K FLIP FLOP |
| Z11,12 | 1402701 | C-8000-00S-7493 | I.C. 4 BIT BINARY COUNTER |
| Z13,16 | 1402401 | C-8000-00S-74S4 | I.C. 4 WIDE 2-I A/O INVERT GATE |
| Z21 | 5601801 | A2801-008 | I.C. DUAL OP AMP (NSC SL19988) |
| Z18 | 1402101 | C-8000-00S-7410 | I.C. TRIPLE 3-I NANO GATE |
| Z10,17 | 1401801 | C-8000-00S-7402 | I.C. DUAD 2-I NDR GATE |
| Z20 | 6700601 | A2701-057-1 | I.C. CERMET RESISTDR PACK |
| Z1S | S600701 | A2701-057-1 | I.C. PRDGRAMABLE R.O.M |
| CR1,2,3,4,6,6 | 1200301 | 1N4148 | DIODE, SIGNAL |
| D1 | 1304601 | A2701-0S7-1B | TZ-81 |
| D2 | 1302401 | 2NS460 | TSTR FIELD EFFECT P CHANNEL |
| D6,7 | 1301701 | 2NS172 | TSTR SI NPN |
| DB | 1302801 | 2N6076 | TSTR SI PNP |
| D5 | 1301601 | 2N4870 | TSTR SI UNI JUNCTIDN |
| O3,D4 | 7S02601 | APL4027-008 | TSTR ASSY NPN/PNP |
| C17,1B | 1100612 | TAG00 10/35 50/20 | CAP TANT 10uf 3SV +S0-20% |
| C4,6,1S | 1100601 | TAG00 22/I6 20/20 | CAP TANT 22uf 16V 20% |
| C20 | 1100602 | TAG00 3.3/20 10/10 | CAP TANT 3.3uf 20V 10% |
| C19 | 1101104 | 22SP22492XD3 | CAP POLY .22uf 200V 10% |
| R29 | 1000901 | U201R101B | TRIM POT I00 OHM |
| R24,37,49 | 1000909 | U201R103B | TRIM POT 10K |
| R38 | 5700703 | B-2801-006-3D | PDT SLIDE 100K LIN |
| R40 | S700702 | B-2801-006-2D | POT SLIDE 100K LDG |
| R11 | S700701 | B-2801-006-1D | PDT SLIDE 1M LDG |
| R32 | 6700704 | B-2801-006-4D | PDT SLIDE 1K LIN |
| P2 | 220080S | B2701-071-1B | PLUG TD PLUG ASSY 26 PIN 9" |
| P3 | 2200806 | B2701-071-2B | PLUG TD PLUG ASSY 16 PIN 16" |
| S1 | 1900801 | 02-481-0001 | SWITCH RDCKER OPTT |

## BOARD B

| REFERENCE | ARP PART NUMBER | ARP/MFG NUMBER | DESCRIPTION |
|---|---|---|---|
| Z6 | 1400801 | A-2B01-009 | I.C. DP AMP (NSC) AL19986 . |
| Z4 | 1401701 | C-8000-00S-7400 | I.C. DUAO 2-I NAND GATE |
| ZS | 1401901 | C-8000-00S-7403 | I.C. DUAD 2-I NAND GATE O/C CDLL |
| Z1 | S600801 | A2701-057-2 | I.C. PRDGRAMMABLE R.O.M. |
| Z2 | 5600901 | A2701-0S7-3 | I.C. PRDGRAMMABLE R.DM. |
| Z3 | S601001 | A2701-057-4 | I.C. PROGRAMMABLE R.O.M. |
| D1,4,6 | 1304601 | TZ-81 | TSTR SI NPN |
| D3,7,8 | 1301701 | 2NS172 | TSTR SI NPN |
| D2,6 | 1302801 | 2N6076 | TSTR SI PNP |
| CR1-27 | 1200301 | IN4148 | DIDDE SI SIGNAL |
| C2 | 1101103 | 225P10491WD3 | CAP PDLY .luf 10% 100V |
| C3 | 1100608 | TAG00 1/35 10/10 | CAP TANT luf 10% 3SV |
| C12 | 1100611 | TAG00 3.3/3S 10/10 | CAP TANT 3.3uf 10% 35V |
| | 2101302 | 16-511-10 | SOCKET 16 PIN |
| J4,S | 2101301 | 14-511-10 | SOCKET 14 PIN |

## BOARD C

| REFERENCE | ARP PART NUMBER | ARP/MFG NUMBER | DESCRIPTION |
|---|---|---|---|
| Z1 | 1400401 | B4023-006-2 | I.C. OP TRANS AMP (RCA CA3080) |
| Z2,3 | 1401101 | A-2801-008 | I.C. OP AMP (NSC) SL19988 |
| Z4 | 1402001 | C-8000-005-7405 | I.C. HEX INVERTER O/C COLL |
| Z5 | 1401901 | C-8000-005-7403 | I.C. QUAD 2-I NAND GATE O/C COLL |
| Z6 | 5601101 | A2701-057-5 | I.C. PROGRAMMABLE R.O.M. |
| Z7 | 5601201 | A2701-057-6 | I.C. PROGRAMMABLE R.O.M. BLUE |
| Z8 | 5601301 | A2701-057-7 | I.C. PROGRAMMABLE R.O.M. VIOLET |
| O4,5,6,12 | 1301701 | 2N5172 | TSTR SI NPN |
| O11 | 1304601 | TZ-81 | TSTR SI NPN |
| O1,2,3,7,8,9,10, 13,14 | 1302801 | 2N6076 | TSTR SI PNP |
| CR1,2 | 1200301 | IN4148 | OIODE SI SIGNAL |
| R45 | 1000901 | U201R101B | POT TRIM 100 OHM |
| R20,54 | 1000913 | U201R5038 | POT TRIM 50K |
| M1 | 7201001 | 4034-004-PL-C | ENCAPSULATED MOOULE, V.C.F. |
| C43 | 1101102 | 225P47391WO3 | CAP POLY .047uf 10% 100V |
| C31 | 1100143 | LTMD | CAP CER ,0022uf 10% 50V |
| C39 | 1100606 | TAG00 .47/35 10/10 | CAP TANT .47uf 10% 35V |
| C2,3,4 | 1100612 | TAG00 10/35 20/20 | CAP TANT 10uf 20% 35V |
| C41 | 1101104 | 225P-22492XD3 | CAP POLY ,22uf 200V 10% |
| | 2102302 | 16-511-10 | SOCKET 16 PIN |

## BOARD D

| REFERENCE | ARP PART NUMBER | ARP/MFG NUMBER | DESCRIPTION |
|---|---|---|---|
| Z5 | 1400801 | A2801-009 | I.C. OP AMP (LM301AN) |
| Z3 | 1401101 | A2801-008 | I.C. DUAL OP AMP (LM1458) |
| Z2,4 | 1400501 | CA3086 | I.C. TSTR ARRAY NPN |
| Z1 | 5601401 | A2701-057-8 | I.C. PROGRAMMABLE R.O.M. GRAY |
| O5 | 1301701 | 2N5172 | TSTR SI NPN |
| O1,2,3,4 | 1302801 | 2N6076 | TSTR SI PNP |
| CR1-9 | 1200301 | IN4148 | DIOOE SI SIGNAL |
| R20 | 5601802 | B2801-010-2 | POT ROT 100K LIN |
| C12 | 1100609 | TAG00 1/35 20/20 | CAP TANT 1uf 20% 35V |
| C14 | 1100610 | TAG00 1,5/35 10/10 | CAP TANT 1,5uf 10% 35V |
| C11 | 1100612 | TAGpp 10/35 20/20 | CAP TANT 10uf 20% 35V |
| C10 | 1100606 | TAG00 ,47/35 10/10 | CAP TANT ,47uf 10% 35V |
| S1-7 | 1901002 | 02-481-0010-B | SWITCH DPDT WHITE |
| P6 | 2200805 | B2701-071-1B | PLUG TO PLUG ASSY 16 PIN 9" |
| P7 | 2200806 | B2701-071-2B | PLUG TO PLUG ASSY 16 PIN 15" |

## BOARD E

| REFERENCE | ARP PART NUMBER | ARP/MFG NUMBER | DESCRIPTION |
|---|---|---|---|
| Z7 | 1401701 | C-8000-005-7400 | I.C. OUAD 2-I NAND GATE |
| Z8 | 1401801 | C-8000-005-7402 | I.C. QUAD 2-I NOR GATE |
| Z6 | 1401901 | C-8000-005-7403 | I.C. OUAD 2-I NANO GATE O/C COLL |
| Z5 | 1402501 | C-8000-005-7473 | I.C. DUAL J-K FLIP FLOP |
| Z9 | 1402601 | C-8000-005-7474 | I.C. DUAL D TYPE FLIP FLOP |
| Z11 | 1402901 | C-8000-005-74I50 | I.C. DATA SELECTOR |
| Z3 | 1403001 | C-8000-005-74174 | I.C. HEX D TYPE FLIP FLOP |
| Z1,2 | 1403101 | C-8000-005-7242 | I.C. OUAD 2-I EXCL NOR GATE |

| | | | |
|---|---|---|---|
| Z10 | 1403201 | C-8000-005-8601 | I.C. RETRIGGERABLE ONE SHOT |
| Z4 | 1402501 | C-8000-005-7473 | I.C. 4 BIT BINARY COUNTER |
| CR1 | 1200301 | IN414B | OIOOE SI SIGNAL |
| C1 | 11006102 | TAG00 3.3/20 10/10 | CAP TANT 3.3uf 10% 20V |
| J3 | 2101302 | 16-511-10 | SOCKET 16 PIN |
| P4 | 2200803 | B-2701-070-1-B | PLUG TO PLUG ASSY 14 PIN |

## BOARD F-II

| REFERENCE | ARP PART NUMBER | ARP/MFG NUMBER | DESCRIPTION |
|---|---|---|---|
| Z3 | 1401701 | C8000-005-7400 | I.C. Quad 2 INPUT NAND GATE |
| Z1,2 | 1403701 | SN74148 | I.C. PRIORITY ENCOOER |
| S1-15,17 | 1901001 | 02-481-0009B | SWITCH ROCKER OPOT BLACK |
| S16 | 1901002 | 02-481-0010B | SWITCH ROCKER DPDT WHITE |
| FDRZ3 | 2101301 | 14-511-10 | SOCKET DUAL IN LINE 14 PIN |
| FORZ1,2 | 2101302 | 16-511-10 | SOCKET DUAL IN LINE 1B PIN |
| P5 | 2200804 | 82701-070-2 | PLUG TO PLUG ASSY 14 PIN |

## BOARD G

| REFERENCE | ARP PART NUMBER | ARP/MFG NUMBER | DESCRIPTION |
|---|---|---|---|
| Z1 | 1401301 | UGA7723393C | I.C. VOLTAGE REGULATOR |
| Q5,9,10 | 1301701 | 2N5172 | TSTR SI PLASTIC NPN |
| Q4,7 | 1302801 | 2N607B | TSTR SI PLASTIC PNP |
| Q8 | 1302801 | 2N5494 | TSTR SI PLASTIC NPN PWR |
| D1,6 | 1303401 | 2N6179 | TSTR SI PLASTIC NPN PWR |
| Q3 | 1302201 | 2N5367 | TSTR SI PLASTIC PNP |
| Q2 | 1301801 | 2N5232 | TSTR SI PLASTIC NPN |
| CR1,2,3,4,7 | 1200401 | IN4448 | OIOOE SI LOW CURRENT |
| CR5,6 | 1200201 | IN4001 | OIODE SI MEO CURRENT |
| R2 | 1000310 | 1-4-5P-4E7 | RESISTOR CARB FILM 6.6DHM 6% 1/2W |
| R17 | 1000108 | BWH-2-0,27OHM | RESISTOR WW 0,27DHM 10% 2W |
| R5-R13 | 1000916 | U201R104B | POT TRIM 100K |
| C7 | 1100607 | TAG00 .47/35 20/20 | CAP TANT EPDXY .47uf 20% 35V |
| C2,3 | 1100612 | TAG00 10/35 20/20 | CAP TANT EPOXY 10uf 20% 35V |
| C8 | 1101701 | B41283 250/10 | CAP ELECTRO ALUM 250uf +50-10% |
| C4, C5 | 1101702 | B41010 250/50 | CAPACITDR, ELECTRO. 250 UF 10V |
| C6 | 1101501 | 16T3300 | CAPACITOR, ELECTRO. 33 UF, 16V |
| T1 | 5702201 | C-2701-028C | TRANSFDRMER |
| F1 | 1700403 | MDV-¼ | FUSE PIGTAIL SLDW BLOW ¼A |

## BOARD F-III (PRO/DGX)

| | | | |
|---|---|---|---|
| S1 | 1901002 | 02-481-001D | SWITCH ROCKER DPDT WHITE |
| S2 - 17 | 1902901 | OIGITAST-ST | SWITCH PB SPDT |
| Z1 - 2 | 1403701 | 2N74148 | IC ENCDDER 8 LINE PRIORITY |
| Z3 | 1401701 | 2N7400 | IC GATE 4 X 2I NAND |
| Z4 | 1400501 | CA3086 | IC TSTR ARRAY |
| Z5 | 1403001 | 2N74174 | IC FF HEX TYPE D |
| Z8 - 7 | 1405601 | 2N74145 | IC DECDDER |